

NO. 1

VOL. 4

UNITED STATES NAVAL MEDICAL BULLETIN

FOR THE
INFORMATION OF THE MEDICAL
DEPARTMENT OF THE SERVICE

LIMITED TO PROFESSIONAL MATTERS AS OBSERVED BY MEDICAL
OFFICERS AT STATIONS AND ON BOARD SHIPS IN EVERY
PART OF THE WORLD, AND PERTAINING TO THE PHYS-
ICAL WELFARE OF THE NAVAL PERSONNEL

JANUARY, 1910

(ISSUED QUARTERLY)



WASHINGTON
GOVERNMENT PRINTING OFFICE
1910

NAVY DEPARTMENT,
Washington, March 20, 1907.

This United States Naval Medical Bulletin is published by direction of the department for the timely information of the Medical and Hospital Corps of the Navy.

TRUMAN H. NEWBERRY,
Acting Secretary.

(II)

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PREFACE.

The publication and issue of a quarterly bulletin by the Bureau of Medicine and Surgery contemplates the timely distribution of such information as is deemed of value to the medical officers and the hospital corps in the performance of their duties, and with the ultimate object that both shall continue to advance in proficiency in respect to all of their responsibilities.

It is proposed that the Naval Medical Bulletin shall embody matters relating to hygiene, tropical and preventive medicine, pathology, laboratory suggestions, chemistry and pharmacy, advanced therapeutics, surgery, medical department organization for battle, and all other matters of more or less professional interest and importance under the conditions peculiar to the service and pertaining to the physical welfare of the naval personnel.

It is believed that the corps as a whole should profit, to the good of the service, out of the experience and observations of the individual. There are many excellent special reports and notes beyond the scope of my annual report being sent in from stations and ships, and by communicating the information they contain (either in their entirety or in part, as extracts) throughout the service, not only will they be employed to some purposes as merited, but all medical officers will thus be brought into closer professional intercourse and be offered a means to keep abreast of the times.

Special attention will be given by the instructors of the Naval Medical School to the review of advances in medical science of special professional interest to the service, as published in foreign and home journals, and extracts from these will appear in the bulletin, together with such remarks as the instructors may deem of value to officers on foreign service or sea duty.

Information received from all sources will be used, and the bureau extends an invitation to medical officers to prepare and forward, with a view to publication, matter on subjects relating to the profession in any of its allied branches.

P. M. RIXEY,
Surgeon-General U. S. Navy.

(v)

SPECIAL ARTICLES.

CHRONIC NONSUPPURATIVE OSTEOPLASTIC PERIOSTITIS OF TRAUMATIC ORIGIN.

By Surg. GEORGE PICKRELL and Asst. Surg. L. M. SCHMIDT, U. S. Navy.

The comparative rarity of this disease, the unusual form assumed in the cases to be presented, the profound symptoms and disability produced, the recurrences after thorough operation, and the grave doubt as to the significance of the microscopic pathology are deemed sufficient cause for the presentation of this paper.

The more frequent forms of productive periostitis are those having as their basis a constitutional disease, such as syphilis, the tibial nodes being a common example. In tuberculosis of bone a marginal productive process is commonly seen associated with a central destructive or rarefying process. Osteoplastic periostitis is seen associated with rheumatoid arthritis, and again as a most prominent characteristic of that curious disease, arthritis deformans.

In chronic suppurative diseases of bones the involucrum is the product of an osteoplastic periostitis, caused by long continued irritation of the resistant vascular periosteum.

Chronic nonsuppurative osteoplastic periostitis not based on constitutional disease originates in one of three ways:

1. A single severe blow upon the bone having a crushing action upon the periosteum produces a violent inflammatory reaction. The acute periostitis, instead of subsiding, becomes chronic, and the dormant osteoblasts are stimulated into activity, producing layer after layer of bony tissue of fairly typical structure.

2. In the young, compressing forces applied to the ends of long bones may spring the bone and result in the detachment of a small area of periosteum. An albuminous (or even bloody) fluid collects beneath the periosteum and separates it from the bone. In the resulting reaction layers of bone are formed.

3. Repeated slight injuries such as occur to the more exposed bones of the body may finally produce a chronic periostitis.

All three of the cases here presented were due to the single severe crushing variety of injury.

Youth is a predisposing factor inasmuch as the periosteum has but lately ceased the great activity of early life.

Pathology.—The muscles overlying the bony growths presented little change except in the case of the large, irregular, anvil-shaped tumor, where a bursa, over which the muscles played, had formed over the long, sharp process.

The tumors produced varied greatly in size. The shape varied in all three cases. In one the summit was broad and extended far beyond the base, which formed a pedicle and gave the entire mass an anvil appearance. In another the tumor was shaped like a thick piece of rope, with ridges like strands of the rope twisted one about the other. The third was an even, oval enlargement.

The periosteum in each case was thick, adherent, and very vascular. The surface of the bone in two cases was extremely irregular and in one comparatively smooth.

The internal structure of the tumors varied greatly. The large anvil-like growth had an outer hard compact shell of about one-eighth inch, inside of which was a structure-like cancellous bone which contained numerous cavities filled with dark bloody fluid. This part of the growth was very vascular and bled freely. Near the base of this growth was another portion of compact tissue which also had the shape of an anvil. The other two tumors were of a dense compact structure throughout.

The microscopical picture of the first growth in each case was similar. It showed areas of fairly typical bone interspersed with areas of round cells. These round-cell areas could not be distinguished by the pathologists from the round cells of sarcoma and in each case were classed as suspicious, and radical operation advised in case of return of the growth.

The microscopic picture of the recurrences depended upon the disposition made of the periosteum at the previous operation. Where the periosteum had been preserved and replaced, as in case I, first operation, the recurrent growth had a structure similar to that of the first, namely: Fairly typical bone areas infiltrated with the round cells. Where the periosteum had been destroyed, as in the second operation of case I and the first operations of cases II and III, the return growth had the microscopical structure of lime infiltrated scar tissue. There were the immature round cells, which, however, had much smaller nuclei than the round cells of the parent growth, and cells showing all gradations from round to long fiber-like spindle cells. Then there were areas where the nuclei of the spindle cells began to fade and these passing into areas of solid lime deposit.

While grossly, the recurrences after destruction of the periosteum resembled the original growth, microscopically there was lacking the osseous structure of the original. The round cells present, however,

were still considered strongly suspicious of sarcoma areas by the pathologists, and in all cases radical operation was advised.

Symptoms.—In all three cases the original injury to the thigh was severe and temporarily disabled the victim. In all cases prompt and almost complete recovery from the concussion followed. Only after some weeks or months did there occur local symptoms to indicate that anything more serious than a bad bruise had resulted from the impact.

Pain began to be noticed in the affected thigh. It was worse at night and of a dull, boring character. A local tenderness appeared. Walking began to produce discomfort and there was associated a limping gait. Movements involving the extensor thigh muscles, as in rising from a squatting posture, became impossible in one case. In two cases a hard mass was made out by the patients themselves.

As the night bone pains increased the general health in all patients became impaired. They stated that they had lost weight varying from 10 to 25 pounds from onset of trouble until admission to the hospital. Pallor of the skin and mucous membranes was noticeable, and a blood examination showed a distinct decrease in red corpuscles, while the hæmoglobin was about normal.

In all cases after removal of the first growth there was complete relief of pain, and each man began to gain in weight and the pallor disappeared. With the return of the tumor, weight was lost, pain, especially at night, was severe, and the former pale appearance of the skin returned.

So closely did the improvement of the general health follow removal of the tumors and so rapidly did the general health fail with their return that this was considered to strongly favor a diagnosis of malignancy. Case reports follow:

Case I.—C. A. H., midshipman, first class. Admitted to the United States naval hospital, Annapolis, Md., June 8, 1907, with a diagnosis of osteoma of the right femur.

History: On November 24, 1906, while playing football, he was struck a severe blow on the right thigh at the site of the tumor. The resulting disability was temporary and in a few days the patient was able to walk about as usual, although a sensible local tenderness persisted. He soon noticed slight pain in the thigh when walking, which was increased by those movements which forcibly flexed the right hip or thigh. Any movement which involved the extensor muscles of the thigh caused more or less severe pain. During the day he was free from pain, when at rest. During the night he was disturbed by dull aching pains. The pain and disability had gradually increased to time of admission.

Condition on admission to hospital: Skin pallid. Conjunctival and buccal mucosa pale. Walked with a limp and, when he stooped

to the ground, was unable to use extensor muscles of right thigh to rise. Palpation of outer anterior aspect of middle of right thigh presented a distinct mass, the outline of which was obscured by the large overlying muscles. Pressure over the mass was painful.

A radiograph (pl. 1), taken June 9, showed an irregular mass on the outer anterior aspect of the femur, 8 inches long and raised $1\frac{1}{2}$ inches from the shaft of the bone. The outline of the compact shaft could be traced along the entire distance of the growth. The picture of the tumor mass showed lighter and darker areas, indicating different densities or thickness, and the lower border projected into the soft tissues as a sharp spicule for a distance of 2 inches.

First operation, June 13, 1907: Ether anæsthesia. Incision 8 inches long directly over tumor, through the muscular layers to the hard mass. This was covered by the thickened periosteum which dipped into the crevices of the surface. This membrane, together with the soft tissues, was reflected exposing the bony tissue proper. The surface of the latter was very irregular, compact, and hard. As the tumor was attacked with mallet and chisel, softer areas were reached below the surface, and irregular cavities, containing fibrino-mucilaginous material, were opened. The entire mass was removed smooth with the surface of the femur. The sudden increase in density easily distinguished the shaft of the bone. The vascularity of the structure was marked, some of the cavities apparently being filled with blood. The under surface of the periosteum was wiped over with pure carbolic acid and then replaced. The wound was closed by suturing in layers, the muscular aponeurosis, the fascia lata, and skin, and a small wick drain inserted.

Post-operative history: At the end of ten days the operative wound was completely healed. A few days later the patient was allowed up and began walking about. The general health improved and the appetite was good. On June 30, a deep induration at the lower part of the wound was discovered and opened, and a quantity of thick yellowish fluid escaped. A radiograph (pl. 2) taken at this time showed no recurrence, the contour of the bone being perfectly normal.

July 20: Patient complained of returning local pain similar to that experienced before operation. Pallor had increased and there had been a loss of 5 pounds in weight since June 13.

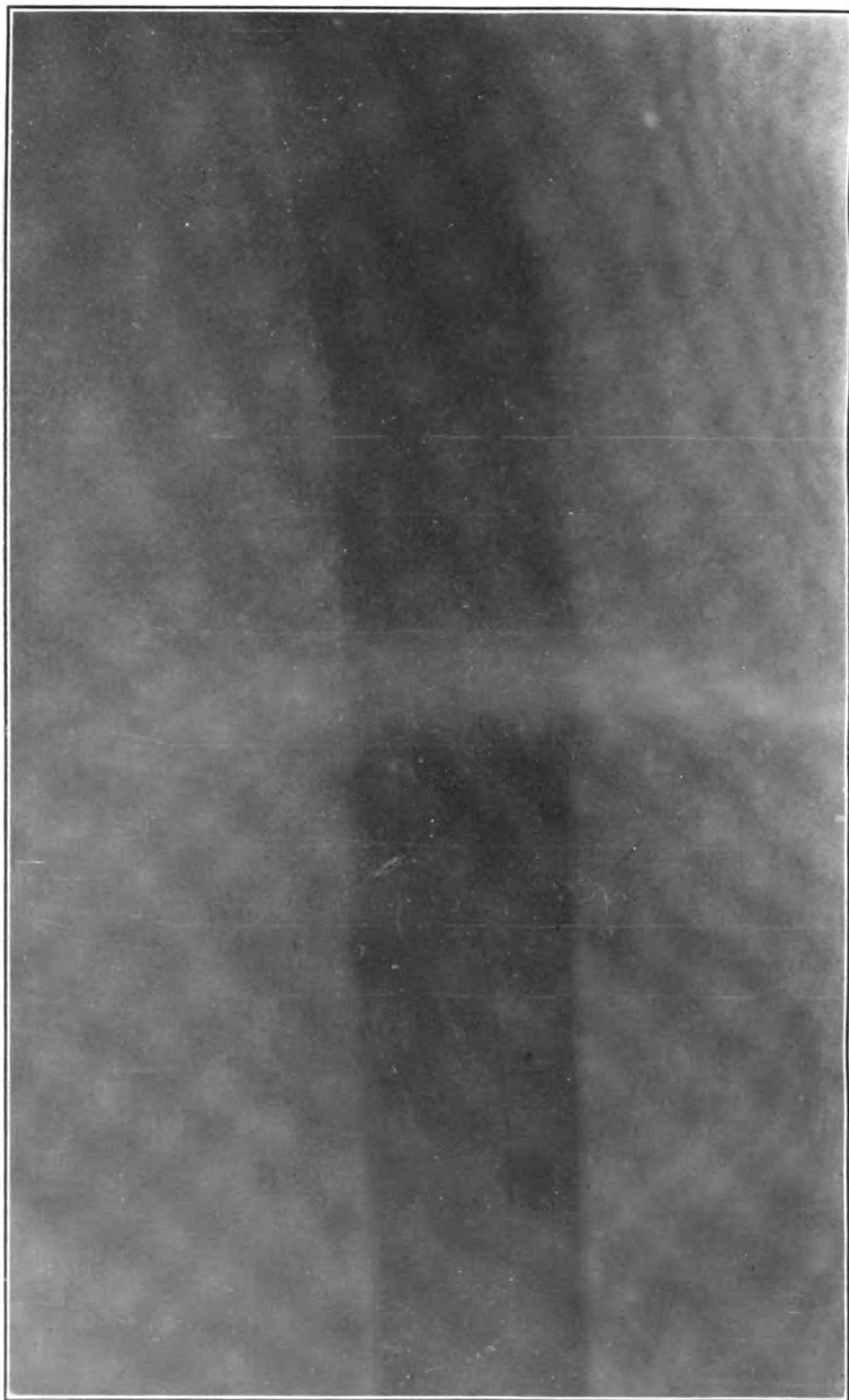
July 21: A radiograph (pl. 3) showed recurrence at the lower part of the site of the former growth. The recurrence was less dense than the original, about 2 inches long, and extended one-half inch from the shaft.

Second operation, July 24: Ether anæsthesia. Leg made bloodless by Esmarch bandage and constrictor. Incision 6 inches long. Some hard scar tissue had to be cut through at the surface of the

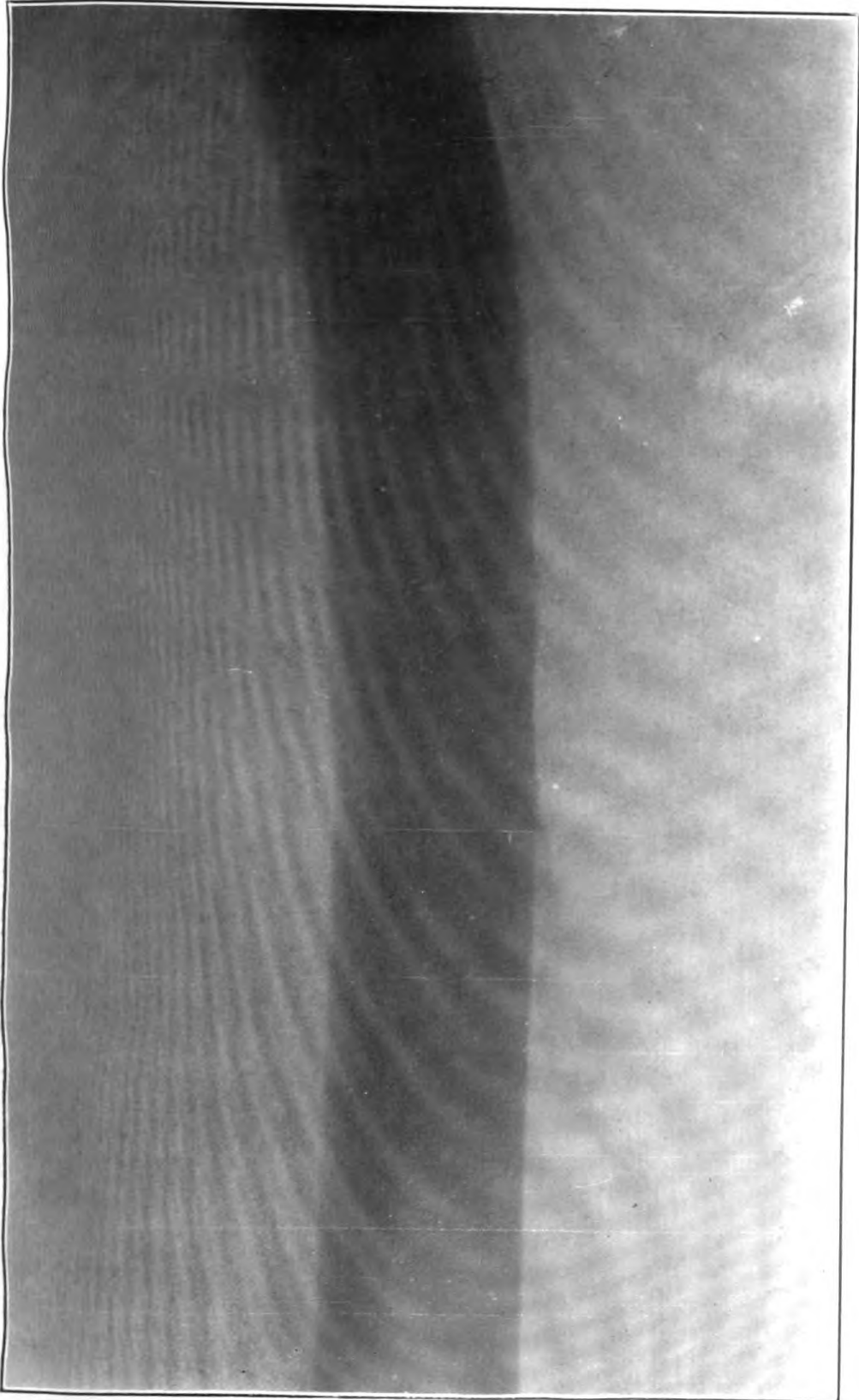


OSTEOPLASTIC PERIOSTITIS CASE I, C. A. H., MID. RIGHT FEMUR. TAKEN JUNE 9, 1907.

PLATE II

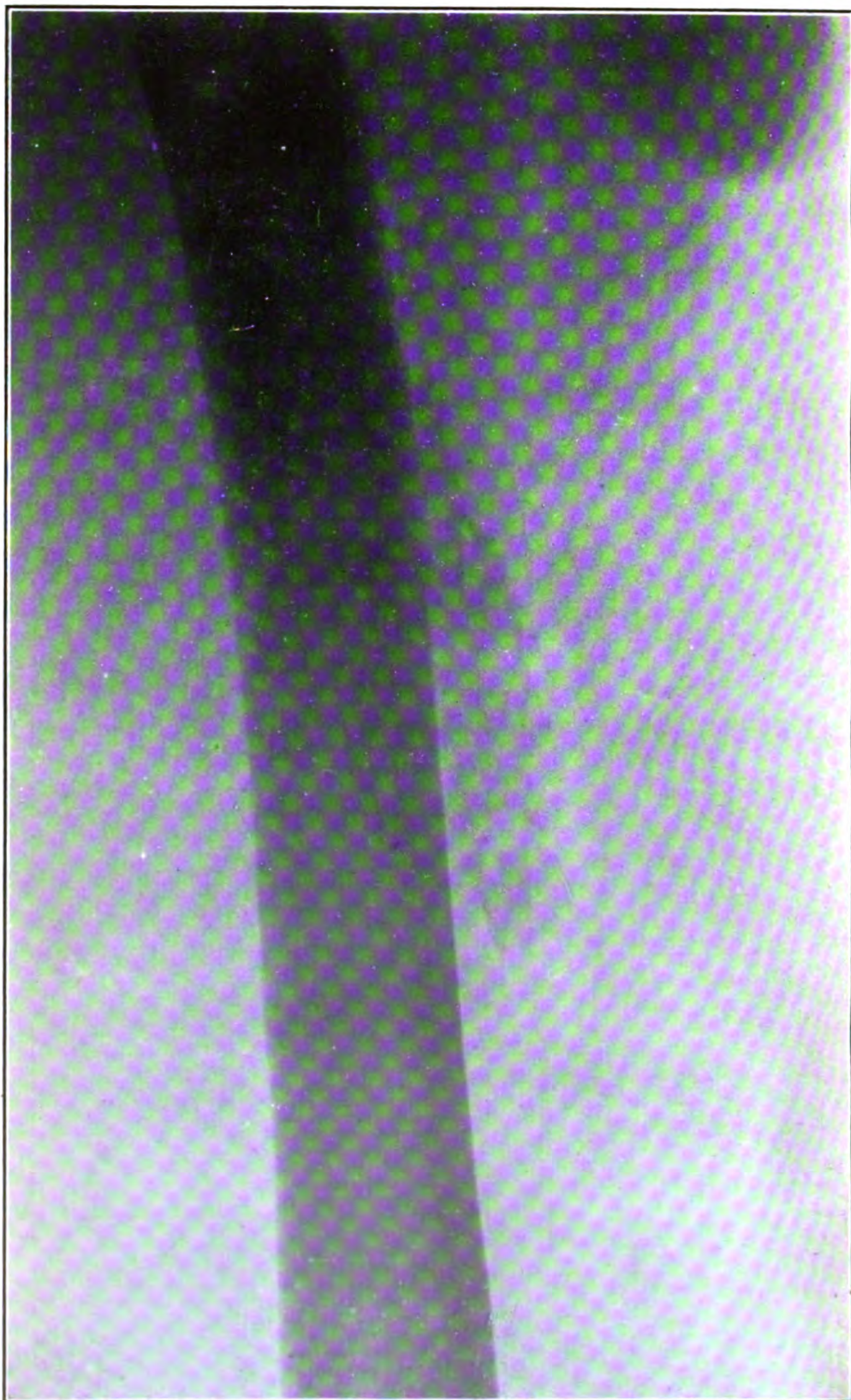


OSTEOPLASTIC PERIOSTITIS. CASE I, C. A. H., MID. RIGHT FEMUR. TAKEN JUNE 27, 1907,
TWO WEEKS AFTER FIRST OPERATION.



OSTEOPLASTIC PERIOSTITIS. CASE I. C. A. H., MID. RIGHT FEMUR. TAKEN 38 DAYS AFTER
FIRST OPERATION. SHOWING RECURRENCE.

PLATE IV.



OSTEOPLASTIC PERIOSTITIS. CASE I. C. A. H., MID. RIGHT FEMUR. TAKEN AUGUST 31,
1907, 38 DAYS AFTER SECOND OPERATION. SECOND RECURRENCE.

growth. The tumor was of the size shown in the radiograph, but much denser than the shadow indicated. It contained three cysts from one-fourth to one-half inch in diameter, filled with a thick black fluid. The tumor was entirely removed and the surface of the femur smoothed with an electric burr. The periosteum over the growth was excised and the adjacent tissues cauterized. Wound closed with gauze drainage.

Because of recurrence, the character of the growth was suspected of being malignant, and sections were carefully preserved and sent to the Naval Medical School laboratory for study.

Pathological report: Sections of the tissue taken from the surface of the growth showed a structure indicative of chronic inflammation, fibrous tissue, thickened blood vessel walls, and a few round cells.

Sections of the tumor itself showed an osteoid rather than an osseous structure. No typical Haversian systems could be made out. There were irregular columns, some of which contained cells and resembled cartilage, while others had lost the cellular structure and were homogeneous. At intervals the columns were interrupted by areas of round cells which extended into the osseous or cartilaginous structure. The blood vessels were of the embryonic type. The conclusion was that the tumor was a fibro-chondro-osteoma. Slides were sent to three leading pathologists and the following reports were received:

I. Histologically the specimen is that of a fibro-chondro-osteoma, with a very suspicious cellular area. My experience with neoplasms of this type is that they usually recur, generally becoming more sarcomatous in nature, and I have come to advise that they be treated as sarcomata. The origin is probably periosteal. If an extensive local incision could be made it might be tried again, as, in the present stage, I do not think there is much danger of metastases. Should recurrence again take place, a radical operation (hip joint) had best be done, as they are likely in such a case to recur in the stump of an amputation.

II. I see nothing in the specimen sent by you to justify a diagnosis of malignancy. There is a distinct outgrowth of bone, with chronic inflammatory changes and atrophy of muscle. The new bone is very cellular, evidently osteoid rather than osseous, and there is production of masses of cartilage, but the cells of the cartilage do not suggest the embryonic type often found in locally malignant growths. The edge of the specimen opposite the muscle shows apparently an indolent granulating surface covered with blood, with rather abundant polynuclears and many large phagocytic cells filled with red corpuscles.

III. Specimen has a few slight but suspicious areas, but without history would be called nonmalignant. With the history, considered malignant. I incline to the thought that amputation is desirable and should not be induced to take a different view unless the local and general condition of the patient very certainly indicated no present recurrence.

History subsequent to second operation: Recovery from operation was uninterrupted.

August 10: Wound completely healed. Radiograph negative. Pain had ceased, color improved, and there was some gain in weight. Patient was allowed to walk.

August 20: A radiograph was again negative.

September 1: During the week previous to this pain in the leg returned. Six pounds weight had been lost, and the face became pale, drawn, and anxious. A radiograph (pl. 4), taken the previous day, showed a return of the growth, which had already reached a size of 1 by 4 inches. It produced a mottled shadow similar to the original growth, but less dense.

September 7: Another radiograph showed a rapid extension of the tumor.

Third operation, September 8: Technique of removal carried out similar to the previous operations. It was noted that the mass was harder and more compact than the former growths and cavities were not present. The vascularity was distinctly less marked. Microscopic examination showed a structure differing from that of the tumors removed before. There was no typical bony structure, but the specimen consisted of different stages between round cells and solid lime deposit. The wound was partially closed, leaving ample drainage.

Subsequent history, September 21: Wound completely healed and the patient was given three weeks' leave. Returned in good physical condition and with a gain in weight of 10 pounds. There was no pain in the thigh and a radiograph was negative. Returned to duty.

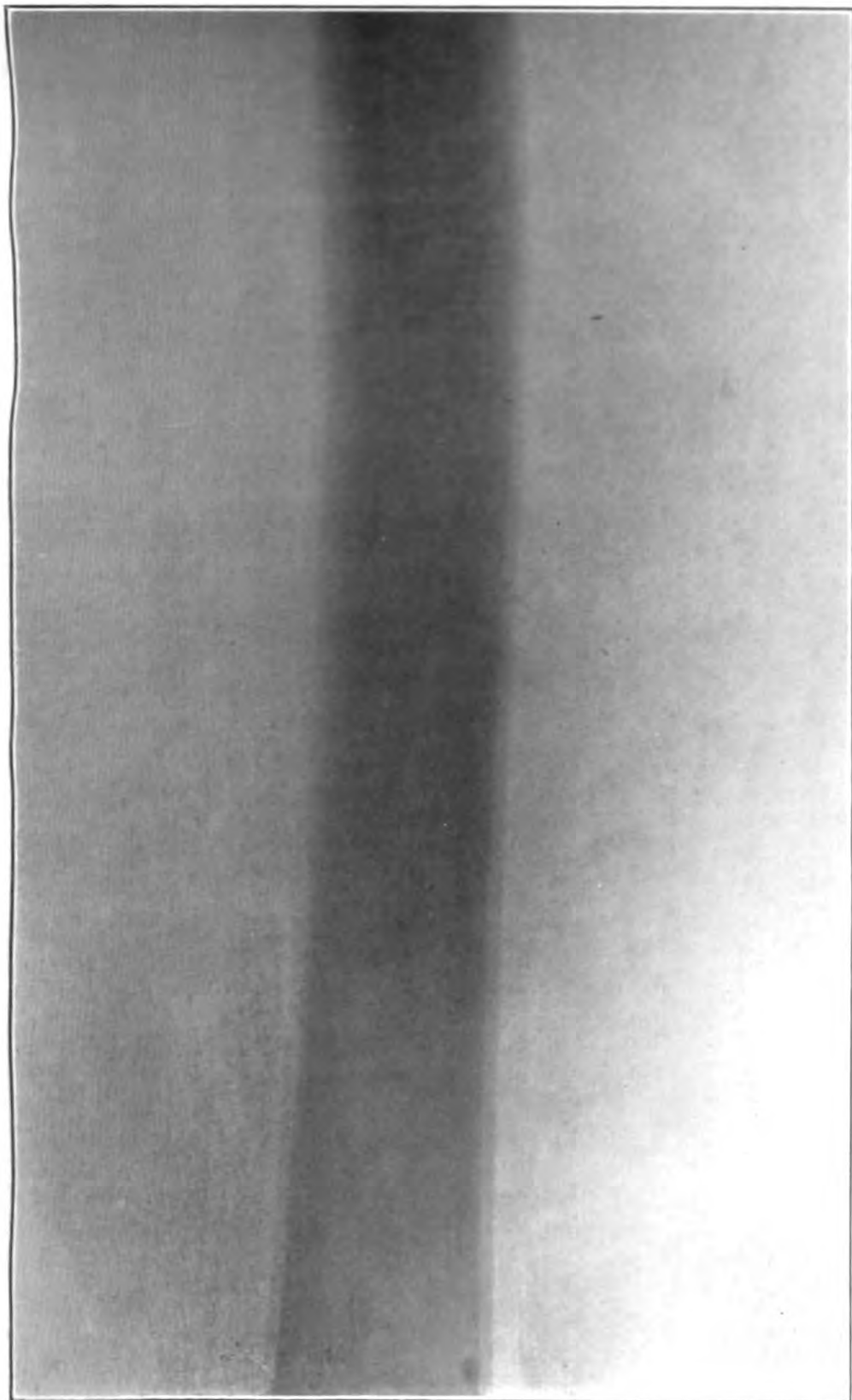
October 27, 1907: Still free from all symptoms and radiograph (pl. 5) shows no recurrence.

May 1, 1909: Patient has been on active duty constantly and has had no further trouble with the leg.

Case II.—D. D. M., midshipman, first class. Admitted to United States naval hospital, Annapolis, Md., February 29, 1908.

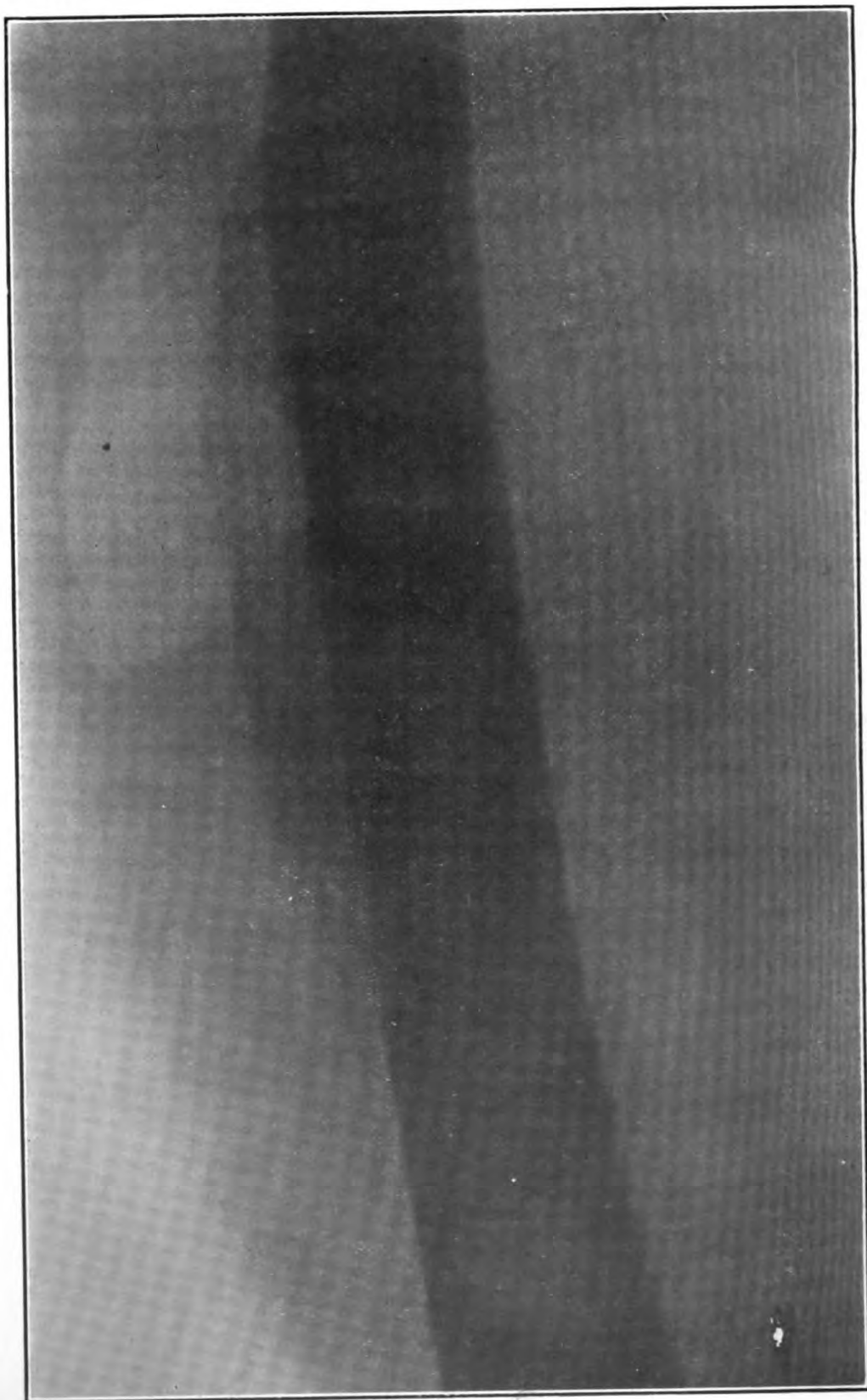
History: In November, 1907, while playing in a football game, patient was struck in the middle of the left thigh by a man rushing head on. He limped after this and had to be taken out of the game. That night he was able to be about and walked into town. The following morning the thigh was so painful that he was confined at sick quarters, where he remained for two weeks. Improvement was rapid, and he soon returned to the football field. However, all stooping postures or any movement that put the extensor thigh muscles upon a stretch caused pain, and he had to abandon football. Up to the time of admission he had suffered a deep, dull pain when performing any movement involving the thigh muscles. He walked without a limp.

Examination: General health apparently good. When squatting down, avoided bearing weight on the left leg because of pain. Palpation showed a deep tenderness over the middle of the anterior surface of the left thigh, and a deep mass could be made out.

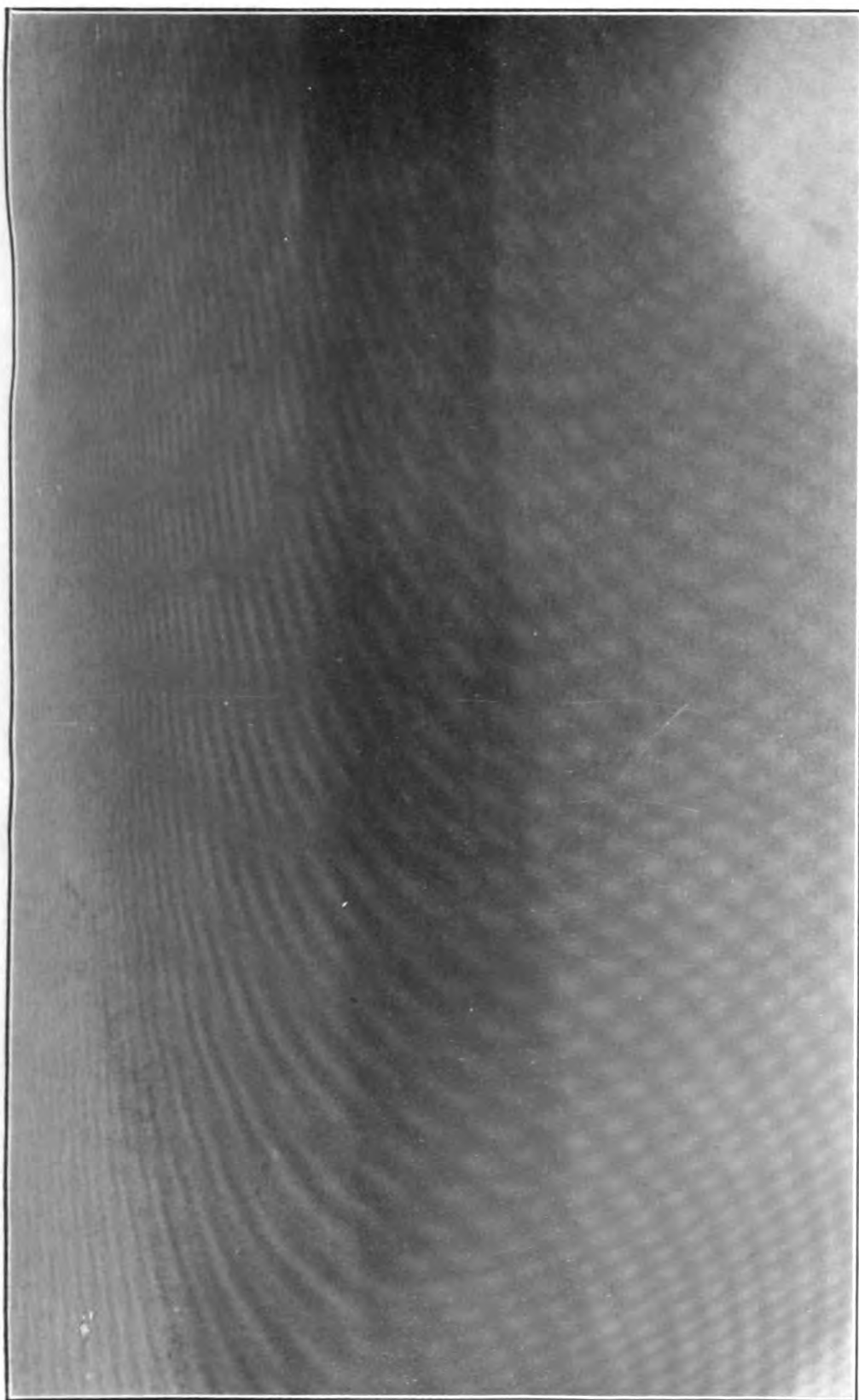


OSTEOPLASTIC PERIOSTITIS. CASE I, C. A. H., MID. RIGHT FEMUR. TAKEN OCTOBER 27, 1907, SEVEN WEEKS AFTER THIRD OPERATION. NO RECURRENCE.

PLATE VI.

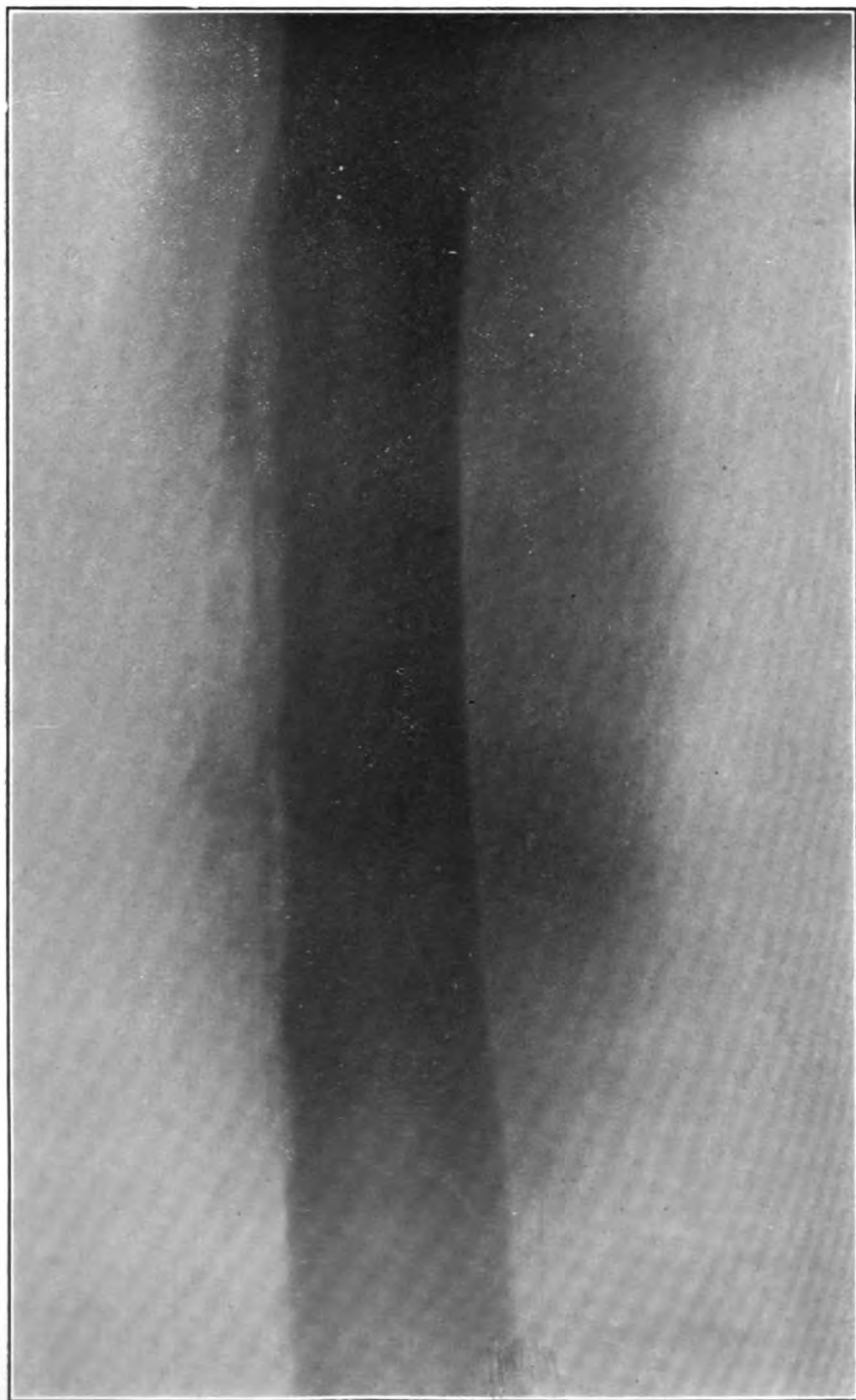


OSTEOPLASTIC PERIOSTITIS. CASE II, E. D. M., MID. LEFT FEMUR. TAKEN FEBRUARY 26,
1908. ORIGINAL TUMOR.



OSTEOPLASTIC PERIOSTITIS. CASE II, E. D. M., MID. LEFT FEMUR. TAKEN MARCH 26, 1908.
TWO WEEKS AFTER FIRST OPERATION.

PLATE VIII.



PERIARTICULAR OSTEOPLASTIC PERIOSTITIS. CASE II, E. D. M., MID. LEFT FEMUR. TAKEN JUNE 6, 1908,
THREE MONTHS AFTER FIRST OPERATION. RECURRENCE.

Radiograph (pl. 6): This showed a growth on the surface of the femur $6\frac{1}{2}$ inches long and extending into the soft tissues about three-fourths of an inch from the bone. The shadow of the tumor was nearly as dark as that of the femoral shaft and showed some mottling, indicating varying density of structure. At the lower part a process nearly 2 inches long projected into the soft tissues of the thigh.

Blood:

Erythrocytes.....	4,000,000
Hæmoglobin..... per cent	80
Leucocytes.....	6,000
Lymphocytes—	
Small..... per cent	34
Large..... do	10
Eosinophiles..... do	1
Neutrophiles..... do	55

No abnormal cells were found.

Urine: With the exception of a few hyalin casts, the examination was negative. A test for Bense-Jones albumose was negative.

First operation: The leg was made bloodless by a Martin bandage and Esmarch constrictor. An incision 8 inches long was made over the middle of the external surface of the left thigh, and the tissues divided down to the bone. An irregular bony mass 8 inches long and varying in width from one-fourth to $1\frac{1}{2}$ inches was exposed. The periosteum was thickened and very vascular. The growth was attacked with chisel, mallet, and sharp curette and entirely removed even with the shaft of the femur. In composition the tumor varied from a dense bony hardness in some places to a softer cancellous structure in others.

The periosteum was destroyed for some distance with the electro-cautery. Muscles and fascia sutured in layers, leaving a small gauze pack against the bone. Skin closed with silkworm gut.

Microscopic pathology: Slides were made and studied. In places, a fairly typical bony structure existed, showing a lamellar arrangement with lacunæ. The rest of the section was made up of irregular cartilage columns and groups of round cells. This specimen closely resembled the sections of case I, except that it contained some areas of more typical bone structure.

Post-operative history: Recovered uneventfully from the operation. For several days there was an evening temperature of 101° to 102° F., which was found to be due to sloughing in the fatty tissues of the thigh. This was drained, and the subsequent temperature was normal.

March 26: A radiograph (pl. 7) showed the shaft of the femur normal in outline, and there was no evidence of any return of the growth.

April 15: The wound was closed and patient able to walk about. He was granted six weeks' leave, at the expiration of which he resumed his work at the Naval Academy.

June 6: Patient was again admitted to the hospital, having had a return of his original symptoms. A radiograph (pl. 8) showed the following: A growth 7 inches long, very irregular in outline and varying in density, occurred at the site of the former tumor. A lighter shadow, cast by the shaft of the femur adjacent to the tumor, suggested a rarefying process in the bone itself.

Second operation, June 15, 1908: General technique similar to that of first operation. A 10-inch incision was made through the old scar to the bone. A tough scar-like membrane was pushed back from the mass by a periosteotome. The growth was about the same size and shape as that found at the first operation and very compact in its composition. It was removed with mallet and chisel and the surface smoothed to the bone with a sharp curette. The cautery was applied to the membranous tissue which had been against the growth and to the surface of the bone. Wound closed in layers with a small gauze drain in the lower angle of the incision. The leg after dressing was placed on a splint to secure absolute rest.

Slides were made from the material removed and the microscopical picture was found to differ considerably from that of the first specimen studied. There seemed to be three distinct classes of cells or tissues, namely:

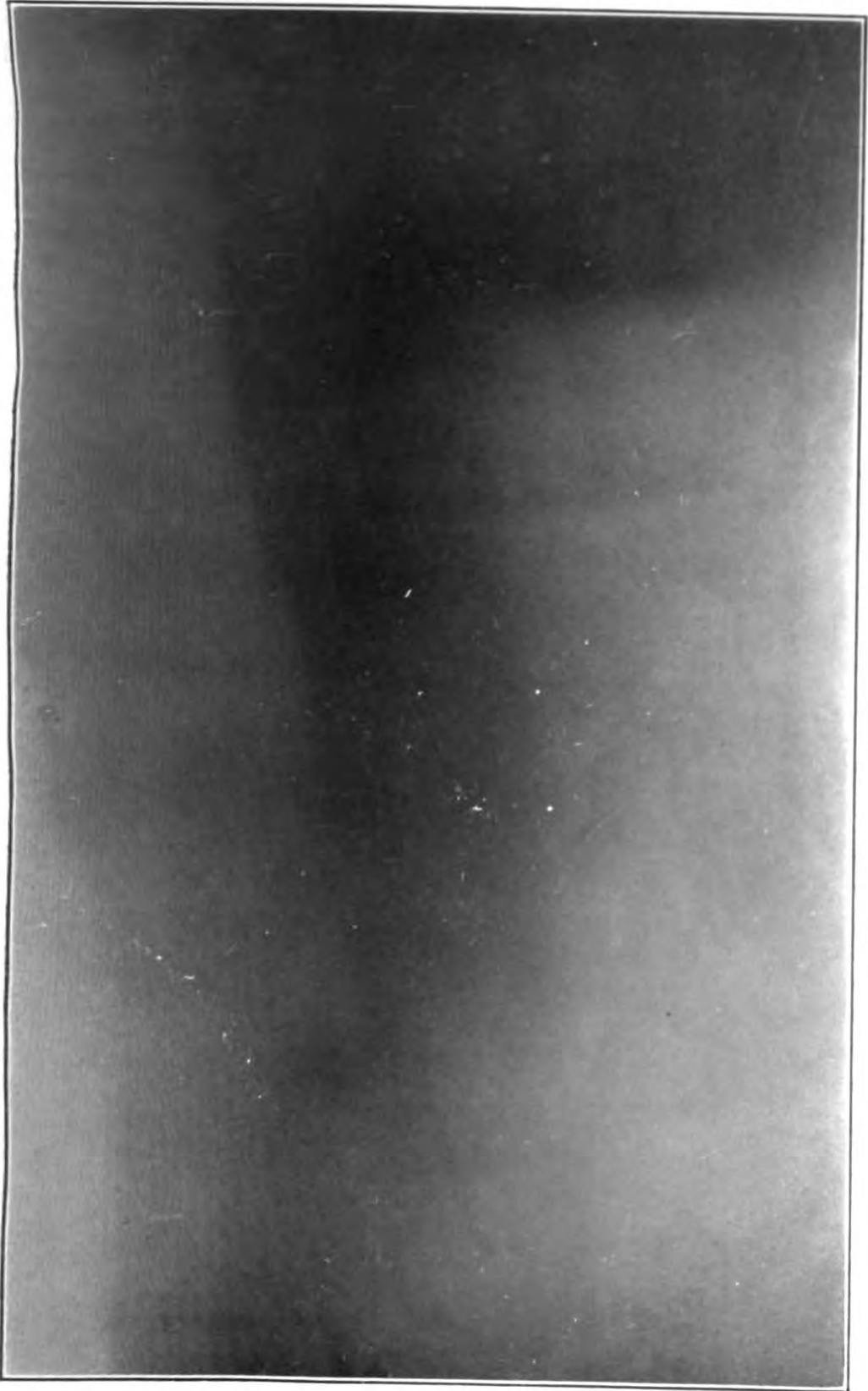
1. Areas of round cells with large well-staining nuclei.
2. Areas of fibrillar structure made up of long spindle cells arranged more or less parallel and producing a wavy appearance. These cells had small, poorly staining nuclei.
3. Areas of noncellular, homogeneous structure which did not take the stain (calcareous.)

The walls of the blood vessels, which were few in number, were much thickened by fibrinous overgrowth. In no place was there any typical bony structure.

Post-operative history: The wound healed promptly, and, as strength returned, patient was sent home on leave. He later returned to duty and there has been no recurrence of the trouble.

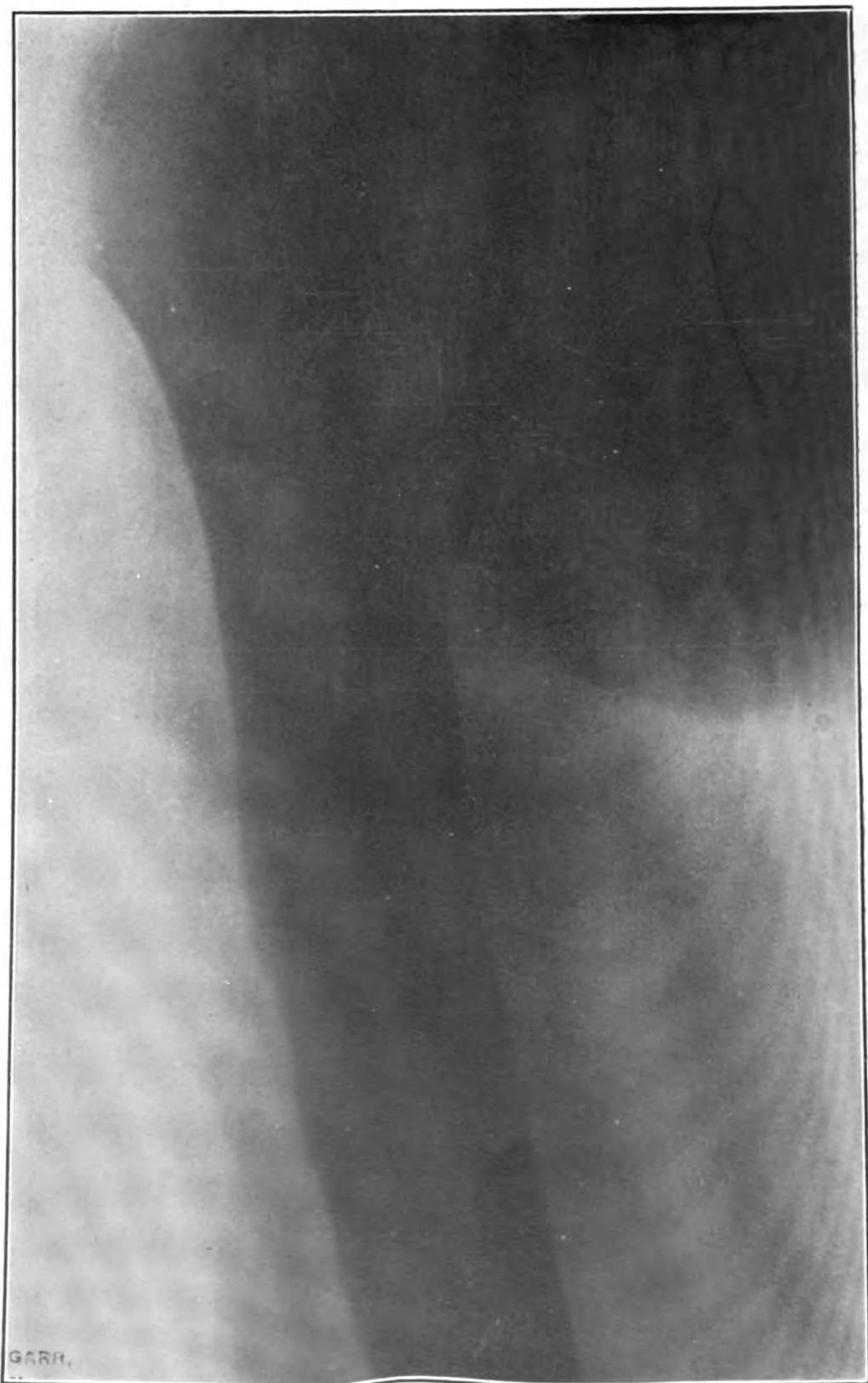
Case III.—G. S. H., midshipman. Admitted to the United States naval hospital, Annapolis, Md., February 14, 1908.

History: In November, 1907, while playing football, patient was struck upon the outer part of the left thigh. For two weeks there was considerable local tenderness, which then subsided. Soon after, he began to be troubled at night with a dull aching pain. This nocturnal pain persisted up to the time of admission to hospital and greatly disturbed sleep. It had become a dull throbbing pain and



OSTEOPLASTIC PERIOSTITIS. CASE III, G. S. H., MID. LEFT FEMUR. TAKEN JANUARY 23, 1908. ORIGINAL TUMOR.

PLATE X.



OSTEOPLASTIC PERIOSTITIS. CASE III, G. S. H., MID. LEFT FEMUR. TAKEN JUNE 1, 1908,
THREE MONTHS AFTER FIRST OPERATION. RECURRENCE.

was referred deep in the left thigh, especially the outer and posterior part. There was no pain due to the use of the leg.

Previous diseases: Patient had had articular rheumatism of a mild type two years before, which was followed by pneumonia.

Examination: The general health appeared excellent. The gait and all movements of the leg were normal. Palpation revealed deep tenderness over the outer aspect of the femur, just above the middle. A deep induration could be felt at this place. A urinalysis was negative.

A radiograph (pl. 9) had been taken January 23. This showed a fusiform shadow 4 inches long on the outer aspect of the left femur, slightly above the middle. The shadow extended three-eighths of an inch from the shaft of the bone and was of uniform density.

Operation, March 3, 1908: Ether anæsthesia. Leg made bloodless by elastic bandage and constrictor. An incision 6 inches long was made on the outer surface of the thigh, the center of which incision was 6 inches below the great trochanter. Fascia and muscles were divided until the oval bony growth was exposed. The surface was very irregular and covered with thickened periosteum which had become adapted to the irregularities; with a chisel and mallet the mass was removed until the normal contour of the shaft was restored. The periosteum was destroyed with the cautery, the cavity packed with iodoform gauze, and partially closed with silkworm-gut sutures.

Post-operative history, March 5: Packing removed and the wound found clean. The left ankle and knee were painful, tender, and swollen. Temperature, 100° to 101.5° F.; pulse, 90 to 100.

March 8: Temperature, 101° to 102° ; pulse, 90 to 110. Left ankle still swollen and painful. Complained of intense sharp pain in lower part of right side of chest, posteriorly, caused and increased by breathing movements. Decreased voice sounds and resonance over lower part of right lung, posteriorly. A few scattered medium moist râles. Wound clean.

March 10: Temperature, 102° . Physical signs over base of right lung continued. Pain decreased.

March 11: Rapid involvement of shoulder and small joints of hands. Severe sweating. Temperature, 101° to 102° . Large doses of salicylates given.

March 12: Temperature, 100.5° . Pain relieved. Sweating profusely.

March 15: Joints free from pain. Chest clearing up.

March 18: Temperature, normal. Steady improvement.

March 22: Radiograph showed normal outline of bone. Patient was soon able to walk about and enjoyed entire freedom from the deep bone pains. He was sent on leave and in a few weeks returned to duty at the Naval Academy.

On May 17 patient reported at the hospital. He had again suffered severely from pain in the left thigh similar to that experienced before operation. The pain was of the dull aching character and worse at night. A diffuse mass could be palpated at the upper part of the operative scar.

A radiograph (pl. 10), taken June 1, showed a bony mass on the femoral shaft about the size and shape of the first growth, but the surface was more irregular.

Second operation, June 15, 1908: General technique the same as that of the first operation. Mass removed with chisel and mallet and surface of bone curetted smooth. Cautery applied and wound closed in layers.

Post-operative history: Recovery was uneventful. The patient returned to his duties in the fall and had no further trouble.

Diagnosis.—In all of these cases the question of diagnosis was a most important, and, for a time, the doubtful feature. The rapid growth of these tumors, their great vascularity, the microscopic finding of the round cells and blood cells of embryonic type, and the rapid return after thorough removal, made an array of facts that strongly suggested sarcoma. The idea of malignancy was further strengthened by the constitutional reaction during the growth of the tumors, viz, loss of weight, pallor, and moderate anæmia.

On the other hand, certain observations tended to show that these growths were of benign nature. The tumors were undoubtedly of traumatic origin. They were produced by the periosteum and superimposed upon the shafts of the bones and did not result in any disintegration of the shaft; and lastly, the microscopic character of the recurrent growth after destruction of the periosteum was such as to practically rule out sarcoma.

Prognosis.—What the outcome of such cases would be without operation is difficult to predict. It would seem, from the rapid growth and extension along the shaft, as well as laterally, that a large area of periosteum would be apt to become affected. The limit of extension was not reached in any case, as operation was undertaken early. The local muscular action would be permanently interfered with by the sharp processes and thus, in cases affecting the long bones of the arms and legs, would produce great disability.

Operation early gives good results, provided the affected periosteum is destroyed and the operative cavity drained sufficiently to prevent accumulations of blood. If operation were delayed too long the patient might be much exhausted from the pain and the amount of periosteum involved be so great that complete removal of the affected portion would threaten the nutrition of the bone.

Treatment.—Where the growth has been large enough to interfere with muscular action only operative treatment is of any use. The

periosteum covering the growth should be destroyed, preferably by excision. Temporary drainage to the bottom of the operative cavity should be used to lessen the accumulation of clots adjacent to the bone, which later would organize and become the seat of deposit of lime salts.

Conclusions.—From the experience based upon the observation of these cases there were deduced the following conclusions:

1. Though these are benign tumors, there seems to exist a close relation between their growth and the condition of the general health.
2. The gross and microscopical structure of the original tumors are hardly distinguishable from those of sarcomata.
3. Early operation is advisable to limit the extension of periosteal involvement.
4. The periosteum involved should be completely destroyed. Iodine and carbolic acid are not sufficiently destructive and the actual cautery should be used.
5. Every effort should be used to prevent accumulation of blood clots adjacent to the bone, following operation.
6. There is danger of mistaking these tumors for sarcoma and unnecessarily mutilating a patient in an effort to save life.

SHOOTING GLASSES FOR RIFLEMEN.

By Surg. E. S. BOBERT, Jr., U. S. Navy.

In May, 1909, when the candidates for the navy rifle team were being assembled at the Naval Academy, it was suggested to the officers in charge of the navy rifle team and the Naval Academy team that the candidates for these two teams should have their eyes carefully refracted. It was stated that this recommendation was made with the idea of fitting each man with spectacles to be worn while practicing for the national matches, and also during the matches, provided the use of spectacles was not found to be a handicap during the period of preliminary training.

The arguments advanced were: (1) that by the use of a suitable shade of amber lens, the blurring of the front sight on bright days would be overcome to a large extent; (2) that the so-called "blowing up on the range" of some men was probably caused by eye strain, due to extra work put upon the ciliary muscles by errors of refraction, and that the use of proper lenses would eliminate this undue strain and tend to obviate this bane of successful rifle teamwork; and (3) that by this examination, men who were unfit for position on the teams by reason of large refractive errors would be thus dis-

covered early and time would not be wasted in attempting to train them for the teams.

The officers concerned approved of these suggestions, and did everything in their power to aid in the work. The Bureau of Navigation and the inspector of target practice approved of the scheme and authorized the necessary expenditure for the opticians' part of the work.

Forty-five candidates for the two teams were examined and fitted with shooting spectacles. The officer in charge of one of the teams thought at first that an examination without the use of a cycloplegic would give the results desired, but after making a few futile attempts it was explained that it was impossible to get accurate results without paralyzing accommodation, and especially so in young men with large amplitude of accommodation and most active ciliary muscles. Hence, a cycloplegic was used in each case. The following routine of examination was followed: Homatropine and cocaine, 2 per cent each, in aqueous solution was used as a cycloplegic, seven instillations ten minutes apart being generally given. The accommodation having been proved to be paralyzed, each eye was refracted in two meridians, at right angles to each other, by retinoscopy. The Javal ophthalmometer was then used. The fundus and media of each eye were next examined. With the vision fogged, each eye was tested with the astigmatic chart, the lenses used and axes selected being noted. Under the cycloplegic the vision of each eye was determined and the best corrected vision and lenses used noted in comparison. The candidate was fitted with a pair of smoked glasses, directed not to use the eyes for any close work until the next day, and to report on the second day following for a post-cycloplegic test.

At the post-cycloplegic test the lenses found necessary to give the best vision under the cycloplegic were modified where necessary, and the results noted. As was to be expected, those who had accepted a small convex spherical correction under the cycloplegic often refused it at the post-cycloplegic test. Wearing the correction determined at the post-cycloplegic test, examination was made for muscle defects, testing both for near and far vision. The correction indicated by these tests was put to a final test on the range, using the rifle sights and the targets, and in both the prone and erect positions.

The optical examination of the 45 candidates for these two teams, all of whom, it must be remembered, had previously acquired some reputation as good rifle shots, revealed every known variety of refractive error. One man was found to have emmetropic eyes. While most of these men showed small degrees of hyperopic astigmatism, all varieties of astigmatism, myopia, and hyperopia were exhibited. The highest degree of myopia retinoscoped: O. D. -1.62 D. in the vertical meridian, and -1.87 D. in the horizontal meridian; O. S. -2.12 D. in each meridian. The highest degree of

hyperopia developed in the examinations, retinoscoped: O. D. +4.25 D. in the vertical meridian and +4.75 D. in the horizontal meridian; O. S. +4.37 D. in the vertical meridian and +4.87 D. in the horizontal meridian. Such a man is manifestly unfit to be a member of a rifle team, especially as he refuses to accept a convex spherical correction. He can only shoot by constant work of his ciliary muscles. Being a young man he has an active ciliary muscle, but his case is typical of the type of man optically who might be expected to "blow up on the range." when his ciliary muscles are tired from the strain of overwork. It was predicted at the close of his examination that he could not make a useful member of a rifle team, and the prediction was fulfilled in that he did not become a member of the team which shot in the final matches.

Perhaps the most pronounced case of astigmatism shown was one which retinoscoped as follows: O. D. +.62 D. in axis 100, +1.37 D. in axis 10; O. S. -.37 D. in axis 80 and +2.37 D. in axis 170.

To summarize the result of the examinations as shown by the shooting glasses prescribed, we find that only 7 of the 45 men shot with plano amber lenses:

Plano each eye	7
Plano one eye, cylinder other eye.....	18
Cylinder each eye.....	12
Sphere one eye, sphere and cylinder other eye.....	3
Sphere and cylinder one eye, cylinder other eye.....	2
Sphere one eye, cylinder other eye.....	1
Sphere and cylinder each eye.....	1
Sphere and cylinder one eye, plano other eye.....	1
Total	45

Considering the shooting eye alone, we have --

Cylinder before shooting eye.....	21
Plano before shooting eye.....	18
Sphere and cylinder before shooting eye.....	3
Sphere before shooting eye.....	3
Total	45

This might lead one to a false conclusion, were it not stated that in ordering correcting lenses the preference of the individual was given every consideration. In fact, unless a man stated at the range test that he was confident that the correction which it was desirable to incorporate in his shooting glasses gave him better vision, the correction was not ordered. For example, the hyperope mentioned above refused correction for his shooting eye, and the lenses ordered for him were O. D. plano; O. S. +.50 cyl. ax. 90. Inasmuch as the fitting of shooting glasses was known by the men to be an untried innovation, many of them had no confidence in the final result, and

perhaps were not so straightforward in their response to tests as they will be another year, and since the use of glasses has been shown to be valuable and not a handicap. Competition for places on these teams was very keen, and one can not blame a man for not doing his best to help the examiner, when he feared that the glasses which would be prescribed might prevent him from "making the team." The men who shot with the plano lens before the shooting eye were in general the poor shots, and either did not "make the team" or occupied positions at the bottom of the list. In short, optical accuracy was sacrificed to individual prejudice in some cases, and not every man who shot with a plano lens before his shooting eye should have done so.

Considering the six best shots in each of the teams—that is, the six best as selected by the officers in charge of the teams from the records of the whole season, and not necessarily as they stood in any one match—we find them shooting with the following lenses:

Navy team:

- No. 1. O. D. +.25 D. cyl. ax. 30; O. S. plano.
- No. 2. Plano.
- No. 3. O. D. —.25 D. sp. —.75 D. cyl. ax. 90; O. S. —.50 D. sp. —.50 D. cyl. ax. 90.
- No. 4. O. D. —1.62 D. sp. —.25 D. cyl. ax. 90; O. S. —2.00 D. sp.
- No. 5. O. D. +.25 D. cyl. ax. 180; O. S. +.25 D. cyl. ax. 180.
- No. 6. O. D. +.25 D. cyl. ax. 90; O. S. plano.

Naval Academy team:

- No. 1. O. D. +.75 D. cyl. ax. 90; O. S. +.50 D. cyl. ax. 90.
- No. 2. O. D. +.75 D. cyl. ax. 100; O. S. —.50 D. sp. +2.50 cyl. ax. 80.
- No. 3. O. D. +.25 D. cyl. ax. 180; O. S. plano.
- No. 4. O. D. +.25 D. cyl. ax. 180; O. S. plano.
- No. 5. O. D. +.25 D. cyl. ax. 90; O. S. +.25 D. cyl. ax. 90.
- No. 6. O. D. —.50 D. sp. —.25 D. ax. 180; O. S. —.25 D. sp.

Only one of the twelve fired without a correcting lens before his shooting eye.

Much of the success of this experiment depended upon accurate optical work and adjustment, and this part was ably attended to by Mr. F. H. Edmonds, of Washington, D. C. Spectacle frames were of course necessary. Shade D amber was determined upon as likely to yield the best shooting results. Large lenses were prescribed in order to cut off as many of the violent rays as possible. With as large a lens as was desirable, it was found that the bolt of the rifle would strike the lower edge of the right frame at each discharge. It was feared that this might prove so annoying as to get on the nerves of the riflemen.

As between the alternatives of using a smaller lens or cutting away the lower edge of the right lens, the latter was decided upon. The lenses being 53 millimeters in diameter, it was found necessary to reduce the vertical diameter of the right lens by 15 millimeters in order to clear the rifle bolt. Toric lenses, presenting manifest advan-

tages for this purpose, were ordered in all except the few cases in which the refractive error to be corrected prohibited their use. The frames, with cushioned ear loops, were fitted to the men while holding the rifle at "aim" both in prone and erect positions. Until one has tried to fit a spectacle frame to men holding a rifle at "aim," one can have no conception of the varying twists of the head and neck adopted by different men. Aside from the difficulty of fitting the spectacle frame to some of these positions, there is the greater difficulty of properly centering the lens. With everybody about a camp using spectacles that looked alike, but varied vastly in optical qualities, it was, of course, necessary to mark each pair of spectacles with identifying marks. To differentiate, one team used a series of numbers as identifying marks, whereas the other used letters.

In order to prevent moisture affecting the glasses, the members of the teams were provided with a proprietary preparation to be rubbed on the lenses in hot or rainy weather, and they were also instructed to wear a sweatband stretched across their foreheads, just above the eyebrows, to prevent perspiration from the head from falling onto the lenses.

The result of the national matches was that the navy team secured first place by a safe margin, and the Naval Academy team made a score that entitled them to sixth place, but were reduced in position for some cause independent of their ability to shoot straight. With the exception of one member of the Naval Academy team, all the members of these two teams, and the unsuccessful candidates for the teams, shot with the shooting glasses prescribed for them throughout the period of preliminary training as well as throughout the matches.

So far as is known to the writer, this is the first time that a systematic attempt has been made to refract and fit shooting glasses to every member of a rifle team. Being an innovation, it would be valuable to have the opinions of the riflemen themselves as to the value of these shooting glasses. Unfortunately the writer was out of the country at the conclusion of the national matches, and before his return the members of the winning navy team had been so scattered that it was impossible to communicate with them and get their opinions. Inquiries were addressed to the officers in charge of the navy and Naval Academy teams and to 13 midshipmen members of the latter team. The officers in charge of the teams state that, judging from the experience of the past season, they approve of the use of glasses by riflemen, and would recommend that every member of a rifle team be fitted with shooting glasses. They state that headaches were rare during the season of training, whereas in former seasons they had been common. They also state that the glasses were habitually worn by the men when shooting, and were generally worn whenever on the range. They state that the blurring of the

front sight on very bright days was almost entirely prevented by the glasses; that wind did not affect the glasses, but that rather the use of the glasses prevented the excessive lacrimation common in high winds; that the glasses could be used satisfactorily in all lights where shooting was possible; that there was a certain amount of trouble in regard to moisture on the glasses on very hot days; and that some of the frames became bent in the rough usage to which they must necessarily be put while on the range. Eleven queries were addressed to each of the 13 midshipmen. The queries and replies were as follows:

1. What is your opinion of the glasses furnished you? All 13 expressed opinions termed as "satisfactory" or "excellent," one even going so far as to say that his score with glasses is 5 per cent better than it is without them. One man states in addition: "I could see clearer on the long ranges, but there was a slight blurring of the front sight which prevented my using them very much." This man was myopic and astigmatic and did not report for the final range test, so there is a possibility that the correction ordered was not as exact as might have been prescribed. Without knowing of this report from him, the officer in charge of the team speaks of him to me as follows: "——— complained of his glasses all season. He had trouble to hold in elevation at long ranges. He was never fitted at the range, and I presume did not have exactly the right prescription. Also he aimed so long, habitually, that no eye could hold a good focus for that length of time. When I broke him of that habit he was a great deal better. He was about the same with or without glasses."

2. What is your opinion of the use of glasses by riflemen? All 13 recommend the use of glasses by riflemen.

3. Have you any complaint against the glasses furnished you? If so, what? Twelve men answer "No." One man states the frames were too easily bent, and he thinks a darker shade would have been better.

4. Did you have any unusual sensation when first using the glasses? If so, for how long did you notice it? Four answer "Yes," and in answer to the second query state, "A few minutes" (1), "A day or two" (2), and "two weeks" (1). Nine answer "No."

5. How much did you wear your glasses? Did you wear them when not shooting? If so, explain when and why. All state that they used them when shooting except the one noted above. Seven state that they wore them when not shooting while on the range, looking at targets, etc. Five state that they did not use them when not shooting. The reason given for wearing them when not shooting was generally "to save the eyes."

6. Did the frames fit? Was right lens cut away enough? Ten answer "Yes" and three "No" to the first question. Eleven answer "Yes" and two "No" to the second question.

7. Did the glasses prevent blurring of the front sight on bright days? Eleven answer "Yes" and two answer "Not entirely."

8. What was the effect of the glasses on dark days? All 13 state they noticed no practical difference. One man elaborates this opinion as follows: "They were always an advantage, in my opinion. When it was very dark, removing the glasses made things seem clearer at first glance, but when trying to define the outlines of the target there was no advantage in removing them. I am speaking of times at dusk, when it was too dark to shoot; when the light

was fit for shooting the glasses always gave clearer definition." This man wore only +.25 D. cyl. ax. 90 in each eye.

9. Did the wind affect the glasses? All 13 answer "No."

10. Did you have any trouble with perspiration getting on the glasses? What means did you use to prevent or remedy it? Eleven answer "Yes," one answers "No," and one is indefinite. All mention the use of sweat bands, but it seems that the preparation provided was not used to any extent, because of "More trouble to keep it handy than it was to wipe the glasses."

11. Did you have any experience with the glasses in fog or rain? What result? Eight answer "Yes," two answer "No," and three are indefinite. Five state that glasses are useless when misty. Three state that they are useful unless badly blurred, and one man gives a practical suggestion by stating: "With a cap with a visor to protect the glasses they worked very well on rainy days. Could use them in heavy rain until the peep sight was blurred by drops of water."

Thus it may be said that the riflemen found the glasses useful and satisfactory on the whole.

Ophthalmologically there seems to be no question but that shooting glasses should be of value to riflemen, provided the refraction of each man is carefully and accurately done. They must tend to relieve eye strain, and a long course of preliminary training followed by a match at high tension must develop eye strain where errors of refraction exist. The examination of these men certainly emphasizes the fact that men attempt rifle shooting and attain a considerable degree of proficiency with various and varying refractive errors. Does not the correction of these errors tend to make them better and especially *more consistent* shots?

It is recommended that this experiment be repeated another year. The glasses used this year might well be improved by using a frame of stiffer material. Another improvement suggested is the more constant use of some preparation to prevent the condensation of moisture on the lenses and the use of caps with properly projecting visors to shield the lenses in rainy weather.

SUGGESTIONS ON TAKING FINGER PRINTS.

By JOHN D. HALL, Clerk, Bureau of Navigation, Navy Department.

[Prepared under direction of the Bureau of Navigation.]

The finger-print system of identification has been in use by the Navy Department for three years with satisfactory results.

While a high percentage of the identification records forwarded to the department for file are clear and carefully taken, a large number of imperfect records are also sent, which, in each case, cause unnecessary delay, duplication of work, and a certain amount of incidental correspondence before a satisfactory record is finally obtained.

It needs but a casual examination of the imperfect records to show, in some cases, either ignorance, carelessness, or lack of interest in making the impressions. As the taking of the finger prints is an important factor in the recruiting service the following suggestions are made which will be of value:

Sir Edward R. Henry's book, "Classification and Uses of Finger Prints," divides the patterns into four types, viz, loops, arches, whorls, and composites. There are no deltas in arches and tented arches, so in making impressions of this type it is only necessary to obtain detail without blur. There is one delta in loops and two or more in composites and whorls. Each delta in figure 6 and figure 7 is marked by the arrowhead. A number of lines diverge after running parallel for a certain distance, this point of divergence being called the delta.

It is absolutely necessary that the ridges be distinct and free from blur because in loops the ridges between the delta and core are counted, while in whorls and composites the ridges or succession of ridges which run from the left delta to the right are traced. Unless the ridges are printed free from blur their counting or tracing can not be satisfactorily done. In figure 3 and figure 4 the line drawn from the delta to the core cuts the ridges that are to be counted, while in figure 8 the ridge course traced from the left to the right delta (of fig. 6) is marked by the arrowheads.

The present form holder is not satisfactory, and after experiments with various devices the following-described stand has been found satisfactory and may be used until a better holder can be devised. It consists of a smooth board 24 inches long, 8 inches wide, and three-fourths of an inch thick, with supports or legs under each end which, when the stand is placed on the top of desk or table, will bring the finger-print form about 42 inches above the floor. It should be beveled under the front edge at an angle of 45°, so as to permit the fingers not being rolled to swing underneath the edge, but not sharp enough to crack the form while recording the impressions on it. Drive two tacks on the underside about 7½ inches apart and 1¼ inches from the front edge and stretch a rubber band from one to the other, under which the lower part of the form may be placed while the upper part is being completed.

The very first thing to be done when starting to make a finger-print record is to place the form on the shelf with *the outline figure side uppermost*. The recruit should affix his signature with pen and ink on the line provided for that purpose; then the form should be moved so that the words "Rolled print of the right index finger, to" are directly over the beveled edge of the stand. Now ink the right index finger on the plate and roll an impression of the same in the space provided above the signature.

Should the right index finger tip be missing, the rolled impression of the right thumb or right middle finger may be inserted, but in that case notation as to the exact finger rolled must be made by the examining surgeon above the finger impression.

After the signature and rolled impression of the right index finger have been completed, turn the form over and place it on the stand so that the heavy black line (over the words "left hand") is directly over the beveled edge of the stand, the upper part of the form being held in place by paper weights or by a bar of iron placed with the long edge across the top end and the lower part of the form being held out of the way by the rubber band underneath.

After the rolled impressions of the fingers of the right hand have been recorded in their proper place, the form should be moved up so that the heavy black line over "Plain impression of the four fingers taken simultaneously" is over the beveled edge of the stand. This will still leave the lower part of the form under the rubber band.

To record the plain impressions the form should be placed on the stand with the bottom end of the form directly over the beveled edge of the stand, the paper weights being placed with their lower edges on the heavy black line over the space for the simultaneous impressions.

To prepare the ink plate a small quantity of ink should be squeezed from the collapsible tube onto the ink plate and thoroughly rolled until an evenly coated film of ink is spread over the entire surface. It is practically agreed that the thickness of this film should be less than one-half the elevation of the ridges, and this can be tested by taking an impression. Should the print be too faint more ink should be spread, but if the impression is blurred in consequence of there being too much ink some of it can be taken off by placing a sheet of newspaper on the plate; then run the roller lightly over it. A film of ink of such thickness is needed that when the finger is lightly rolled on the plate a print with black and sharp lines without blur is obtained.

A large number of prints are forwarded to the department so faint that the lines or ridges can not be traced or counted with accuracy. This is caused no doubt by the ink in the tube becoming hard and dry. If this is the case a new tube of ink should be requested at once. In the meantime, and for temporary use only, the ink on hand may be softened and made more pliable by the following process: As soon as the ink is rolled out onto the plate, put two or three drops of some oil (spirits of turpentine or linseed oil preferred) on the plate, then carefully and thoroughly roll the ink and oil together. It will be found that when this is done less pressure will be needed in rolling the fingers on the plate—the oil making the ink adhere more closely than in its present condition. A *dark*

print is preferred to a light one, provided its lines or ridges are not blurred. The screw cap on the ink tube should be replaced immediately after use. Should the ink be stiff or difficult to work on account of cold, the plate may be warmed before a fire or over a radiator.

The film of ink should be rerolled after the impressions of each hand are taken and before attempting to make impressions of the other hand. The thin film of ink on the plate when exposed to the air soon becomes unfit for use and should be cleaned off thoroughly with benzine or ether in order to obtain satisfactory results with subsequent records. When all records are completed, and *always at the close of office hours the plate and roller should be thoroughly cleaned of all ink*. Dirty apparatus is fatal to good, clear work.

Before proceeding to make the finger-print impressions it is absolutely necessary that the fingers of both the operator and recruit be cleansed. The recruit should wash his hands thoroughly with soap and brush, using, if practicable, running water, especial care then being taken to rinse off all soap or lather with cold water. Failure to do this will cause white blotches to appear in the impressions. Immediately before placing the fingers on the inked plate the fingers should be well wiped with a cloth dampened with benzine or ether, which should remove all trace of grease, water, or perspiration.

This now brings use to the actual making of the finger-print record. Some little practice is required before one can obtain satisfactory results in making the rolled impressions. If the operator will experiment and make prints with his own fingers it will become apparent to him just how much pressure should be put on the finger to obtain a good clear record without blurring the ridges together. Lack of interest on the part of some operators results in black, smeary, greasy, or blotchy records. Some operators make impressions of almost the entire finger, while others permit the recruit to put too much pressure on the finger when transferring the impression to the paper form.

The operator should instruct the recruit to relax all muscles in his arm and hand so that the necessary pressure can be put on the recruit's finger tips *by the operator*, and, further, the *recruit should be told not to bear down while inking his fingers or when transferring the impressions to the form*. The operator should stand to the left of the recruit at the end of the table with the recruit facing it. A glance at the recruit's fingers before inking will usually give a good idea as to the amount of ink and pressure needed to secure a good clear print. Each digit of the recruit, which must be quite passive, must be grasped in turn between the operator's thumb and index finger with the index finger of the operator's other hand at the tip end

of the recruit's finger nail. The recruit's finger should be held with a fairly tight grip by the operator's thumb and index finger on either side of the recruit's finger just below the flexure of the end joint. In making rolled impressions, the fingers should be rolled from the **cramped** or most inconvenient position *toward the natural position*, thus preventing blurring when the finger is raised from the form. In other words, the **right** thumb should be rolled from right to left, the fingers from left to **right**, while with the left hand the thumb should be rolled from left to right **and** the fingers from right to left.

The recruit's finger should now be placed on its side on the inked plate with the plane of the nail at right angles to the plane of the plate with the flexure of the end joint just above the edge of the plate. The finger should now be lightly rolled until the opposite side of the nail almost touches the plate. If the rolling is not complete the resulting impression may not include the necessary delta or deltas, and therefore it should be particularly noticed that the finger is properly rolled on the inked plate so as to include the delta or deltas before an impression is made on the paper form. With hard and dry hands it is sometimes necessary to roll the fingers twice on the inked plate before taking an impression, but in that case care should be taken not to roll on a part of the plate that had been used unless the part had been rerolled. After the finger is properly inked the operation is repeated on the paper form and in the service record, thereby completing the finger print impressions.

The method of obtaining the "plain" impressions (at the bottom of the identification record) is to take the fingers of each hand in turn and place the bulbs only on the inked plate. When this is done, press the recruit's fingers together and with his hand limp and flat (not bowed or arched) place it in the space shown on the form and press each finger at the base of the nail lightly with the fingers of the operator. No regard need be paid to the deltas in the plain simultaneous impressions, but the detail must be clearly defined.

A number of records are forwarded to the department which have some of the finger impressions recorded in other than their proper space, left hand printed in the right-hand space, index recorded where the thumb should be, little finger where the ring finger should be, and so on. This can only be done through carelessness or lack of interest on the part of the operator and should be the subject of a reprimand to the operator, as well as to the officer who forwards such imperfect record to the department.

This system of identification was adopted to prevent the enlistment of persons who attempt to reenter the service under assumed names, and extreme caution should be exercised by the person designated to take finger-print impressions. Unless this is done a man, with the assistance or through the connivance of the operator, may so blur or

mix up his finger impressions as to render the record practically worthless.

Another serious cause of trouble is found in cases where finger impressions of several recruits have been taken and the records laid to one side without the recruit affixing his signature on the back. Confusion and errors of this character may be avoided by *requiring the recruit to sign his name first* and then to roll the impression of the right index finger in the space above his signature, as heretofore suggested, completing the record by making the rolled and simultaneous impressions on the face of the form. This will not only prevent smudging, but eliminate entirely the possibility of the recruit signing other than his own identification record.

After the identification record is completed the examining surgeon should scrutinize each form to see if each finger impression is taken in its proper place and in the order specified on the form. The work can easily be verified by turning up the bottom of the form, which will bring the rolled impressions of the right index finger one above the other; then by comparing the simultaneous with the rolled impressions errors can easily be detected. Should it be ascertained that *any finger has been improperly recorded, another form should be prepared and the incorrect one destroyed*. This will save unnecessary correspondence and duplication of work on board ship.

There are cases where, on account of blisters, sores, or some deep-seated skin deformity, it will be difficult to secure good clear prints. In these cases especial care should be taken and at least three forms should be prepared and forwarded.

A finger should not be noted as missing if any portion of the finger above the flexure of the terminal joint remains. The end of a mutilated finger should, in all cases, be inked and recorded as in the case of a perfect digit. Whether or not the remaining portion of a mutilated or amputated joint is sufficient for classification must be left to the judgment of those in charge of the finger-print files.

Attention is invited to the accompanying illustrations which are self-explanatory.

It is believed that the above suggestions, if carefully followed, will lessen the number of imperfect records forwarded to the department.

Sir Edward R. Henry's book "Classification and Uses of Finger Prints" and Navy Department Special Order No. 27 of October 26, 1906, will be of material assistance to any one desiring to go more fully into the subject.

LIST OF ILLUSTRATIONS.

Figure 1. An arch.

Figure 2. A tented arch.

Figure 3. A radial loop. The heavy black line drawn from the delta to the core indicates the ridges that are counted in classifying loops. In this impression the line cuts or crosses 16 ridges.



FIG. 1.



FIG. 2.



FIG. 3.



FIG. 4.



FIG. 5.



FIG. 6.



FIG. 7.

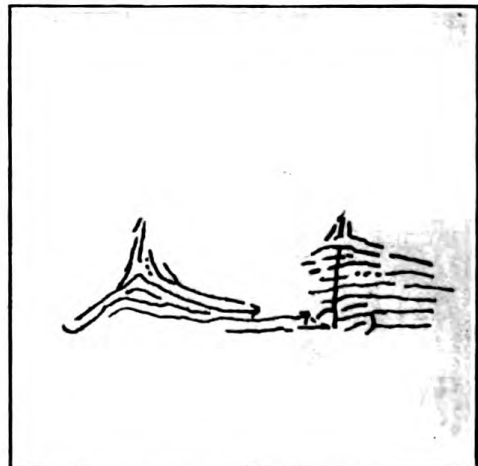


FIG. 8.



FIG. 9.



FIG. 10



FIG. 11.



FIG. 12.



FIG. 13.



FIG. 14.

- Figure 4.** An ulnar loop. In this impression the heavy black line crosses 19 ridges.
- Figure 5.** This impression shows a radial loop that has not been rolled sufficiently to show the delta or outer terminus. This is one of the most common errors in making finger prints. (See also fig. 7.)
- Figure 6.** A whorl. The right and left deltas in this impression are shown by the arrowheads.
- Figure 7.** This impression shows a whorl that has not been rolled sufficiently to obtain the left delta. Only the right delta shows, being designated by the arrowhead.
- Figure 8.** This print shows the manner of tracing the ridges from the left to the right delta in whorls. (See fig. 6.)
- Figure 9.** A composite. This pattern is classed as a whorl and has two deltas.
- Figure 10.** A composite. An examination of this pattern shows three clearly defined deltas, all of which must show for accurate classification.
- Figure 11.** A composite. This impression shows three deltas.
- Figure 12 and Figure 13.** Two impressions of the same finger. Figure 12 has been improperly rolled and shows a loop. Figure 13 has been properly rolled and shows a pattern which is classed as a whorl.
- Figure 14.** An enlarged print of a loop, showing some of the counts or points depended upon to establish or disprove the similarity of an impression brought under consideration. This print shows at least 64 clearly defined points.

MEAT POISONING IN THE NAVY.

By Medical Inspector L. W. CURTIS, U. S. Navy

The obscurity as to the source of infection in certain outbreaks of typhoid fever (?) which from time to time occur on board ships of the navy finds illumination in the results of recent research, which goes to show that the ingestion of tainted meat may produce (1) symptoms of acute poisoning, manifested by purging, vomiting, and other symptoms of an acute gastro-enteritis; (2) those due to a true infection, with a train of symptoms closely simulating typhoid fever (paratyphoid).

The source of infection in the outbreak on the *Connecticut* in February, 1907, which came directly under the writer's observation, was not positively determined by a board ordered to investigate it; nor was there sufficient evidence to warrant the assumption of a definite theory at that time. But in reviewing the clinical features of the epidemic, in the light of recent investigations of paratyphoid fever, this seems clearly to have been an instance of meat poisoning followed by a true infection, with a train of symptoms closely *simulating* typhoid fever. The outbreak occurred at Culebra, shortly after the ship arrived there, and nearly two months after leaving the navy-yard, New York, where sanitary conditions were such as to lay those conditions under suspicion as the source of infection, although, as already stated, not all conclusive as to this.

The first case diagnosed as typhoid was one of a large number of men who, without exposure outside the ship, were attacked with symptoms of acute poisoning, manifested by purging, vomiting, and other symptoms of acute gastro-enteritis. Symptoms persisted in this one case, the others being discharged to duty in from thirty-six to forty-eight hours; but a few days later some of these latter, with others who had not before reported sick, came down with symptoms simulating typhoid fever; in no case might the symptoms be said to have been typically typhoid. In some the fever lasted but a few days, and no death occurred amongst the 40 cases occurring at that time.

Now, the assumption that this epidemic was one of meat poisoning, simulating typhoid fever, and not true typhoid, is based on the symptoms and course being atypical of typhoid and the fact that the manner of handling cold-storage meat in the navy is one that exposes ships' companies to this source of infection, especially in the Tropics.

The manner of handling cold-storage meats is, or was, as follows: The meat is taken out of the refrigerating room on the day before it is to be cooked, in order to thaw it out; the undivided quarter of beef and whole carcasses of mutton are placed in or about the galley, where they remain from fifteen to twenty hours before being cut into cooking pieces and going into the oven. The result, in a tropical climate, is that the superficial parts undergo putrefactive changes, which are often obvious to the nose and eye.

Ships' cooks may usually be depended upon to cut off and reject such superficial parts as are visibly putrid, but the taint may go deeper, and although thorough cooking, such as all ships' cooks give all meats, may or may not destroy putrefactive bacteria, and evil results may or may not ensue from eating such meat, the method is always fraught with dangerous possibilities, besides being a wasteful one.

In December, 1908, while serving as fleet surgeon of the Atlantic Fleet, the writer addressed a letter to the commander in chief, inviting his attention to the insanitary manner of handling the meat ration; and on the ground that diarrheal and dyspeptic disorders, and the complaints sometimes made by the enlisted men of the unpalatable character of the meat ration, were due to this unwholesome method, made recommendations for a change, namely, that meat should be removed from cold storage not earlier than the morning of the day it was to be cooked; that the quarters of beef and carcasses of mutton be immediately severed into cooking pieces and placed in tubs of water for thawing out preliminary to cooking. A board convened on the flagship to inquire into the matter reported that with the galley appliances at hand it was not practicable to carry out the

recommendations. Nothing further, therefore, was done in the matter. The possibility and high probability that these obscure outbreaks of typhoidal disease have their origin in meat that has undergone putrefactive change, due to the manner of handling by the galley force, wholly irrational from a sanitary standpoint, gives the matter an importance not to be ignored. It therefore behooves medical officers to make close inquiry in that direction in seeking the source of infection in such cases; and moreover, it would seem to be important to devise a more rational method of handling meat than now obtains, with the view of averting future outbreaks. The writer found that a 7-pound cut of solidly frozen beef submerged in cool water would thaw in two hours; of course, subdivision of large pieces hastens the process. As frozen meat readily yields to the saw, it is believed to be entirely practicable, with suitable saws, larger than the ordinary butcher's saw, to reduce the daily issue of quarters of beef and mutton to cooking sizes and thaw it out in the manner suggested in ample time for cooking if drawn from the refrigerating room in the morning of the day it is to be served.

RUNNER'S CRAMP. A PECULIAR OCCUPATION NEUROSIS.

By Assistant Surg. L. M. SCHMIDT, U. S. Navy.

Writer's cramp, the best known of the occupation neuroses, was described by Sir Charles Bell in 1830. Since then, much has been written and many forms of cramp have been described, such as occur in telegraphers, typewriters, musicians, sewers, engravers, composers, enamelers, drummers, money sorters, cigarette makers, milkers, shoemakers, and users of the hammer and chisel. All of these have to do with the upper extremities and more or less complicated movements of the hands. The object of this paper is to report an analogous condition, involving the lower extremities and resulting from a special use of the feet.

Occupation neuroses are defined by Gowers as "a convenient designation for a group of maladies in which certain symptoms are excited by the attempt to perform some oft-repeated muscular action, commonly one involved in the occupation of the sufferer." These symptoms consist of: (1) Spasms or cramps, which may be either tonic or clonic; (2) pain, which may be referred to the muscles, bones, and joints, or along the course of a nerve; (3) inco-ordination of movement; (4) tremors; (5) weakness of the muscles involved.

According to the symptoms which predominate, occupation cramps may be (a) motor or spasmodic, or (b) sensory or neuralgic in type. A mixture of the two types is more common.

While the causes which predispose to this affection are not well defined, the immediate cause is well known to be the repeated performance of more or less complicated muscular movements. As the hands carry out these movements almost exclusively, practically all the cases occur in the hands.

The onset is usually insidious and heralded by vague pains of a dull aching character. The muscles are easily fatigued by the accustomed movements. These symptoms increase and are associated with spasm. As a rule, only the muscles used in the special movement are involved and then only when that movement is attempted. However, if rest is not instituted the condition extends, involving other muscles, and pain and cramp may persist in the intervals between movements. The spasm may even occur spontaneously during the period of rest.

Among the theories advanced to explain the neurosis are the following: A weakness or exhaustion of certain muscles allowing overaction of their antagonists; a reflex result of overstimulation of sensory nerves; a derangement of the nerve centers in control of the movement.

Mistakes in the diagnosis of these cases would only occur early before the characteristic symptoms have appeared. In such instances the condition is sometimes called rheumatism or neuralgia.

M. L. S., midshipman, admitted to United States naval hospital, Annapolis, Md., April 24, 1908, complained of pains across the dorsal surface of both feet and extending up the anterior part of both legs to the knee, cramps in the calf muscles and toes, and inability to raise the weight of the body onto toes.

History of present attack.—The onset dated back about two weeks when patient experienced pain across the arches of both feet while attempting his daily practice for the mile run; he continued running that day, but the pains became worse, and when he had completed about a mile he could no longer stand on his feet and was compelled to sit down, still suffering severely from pain across the arches and now extending to the anterior part of the legs; he discontinued running for the day.

On arising the next day, the pains had subsided and he had no trouble in walking; when he attempted to run, every attempt to rise upon the toes was accompanied by severe pain similar to that of the previous day; there was still no pain while walking.

About the third day when attempting to run, a severe cramp occurred in the right leg, involving the calf and toes. The cramp soon disappeared but soreness persisted for several days.

From the time of onset till the date of admission to the hospital he had steadily developed more pain upon attempting the toe position, and finally mild pains persisted during periods of rest; when he



FIG. 1.
RUNNER'S CRAMP. CASE M. L. S. HYPEREXTENSION OF TOES,
WHICH LASTED SIX DAYS.



FIG. 2.
RUNNER'S CRAMP. CASE M. L. S. FRONT VIEW.

remained entirely off his feet for a day all symptoms subsided; during the few days before admission there had been twitching of the toes of both feet and a feeling of numbness was noticed.

Previous history.—For the past four years the patient had been ambitious as a mile runner. With the exception of two or three months each year he had run an average of a mile and a half a day. Each evening he had done the "dip" (down and up) about 50 times to keep his calf muscles strong and enable him to keep on his toes while running. During the previous three months the training had been more severe than usual.

Examination.—The patient was a well-developed, fairly muscular young man. He walked with body slightly bent forward and with short steps, bending the ankles but little and bearing no weight on the toes. The toes were dorsi-flexed, so that no part of them touched the floor when patient walked; the extensor tendons of the toes were very prominent and evidently held the toes in this awkward position; the feet were well arched; a very thick callous existed under the ball of each foot. The legs from the knees downward were rather thin. The shoes of the patient were examined and it was found that the part of the sole under the ball of the foot was almost worn through, while the remainder of the shoe was in good condition.

There was distinctly decreased strength of all the lower leg muscles. All the reflexes of the leg were tested and no abnormality found. There was no tenderness along the nerve trunks. The sensation of numbness was subjective, as all sensory impressions were promptly perceived. No change could be detected in the electrical reactions.

Treatment.—Rest in bed for two days caused all pain to disappear, but the toes were still hyperextended.

May 2: Toes had dropped so that they rested on the floor when walking and all symptoms had gone. Patient returned to duty at the Academy.

May 11: Readmitted to the hospital. While attempting to run in the toe position all the former symptoms had returned. The toes of both feet were elevated so that the axis of each toe was at right angles with the corresponding metatarsal bone; the extensor tendons were prominent and the toes could not be brought to the floor; there was a constant twitching of the extensor muscles of the toes. Pain was severe and the patient was put to bed.

May 17: The extensor muscles of the toes were found relaxed for the first time since May 11.

Soreness in the arch of the foot persisted for some time, but did not interfere with walking. By June 10 all symptoms had again disappeared and the patient was sent on leave, with the advice not to attempt running for a long time.

VENEREAL PROPHYLAXIS.

By Passed Asst. Surg. W. J. ZALESKY, U. S. Navy.

The subject of venereal prophylaxis has now occupied the attention of military surgeons for a number of years, but considering the importance of this subject, with the faint support given in many quarters, its promulgation and universal acceptance is still in a transitory stage.

Many arguments for and against compulsory prophylaxis have arisen, each advocate sustaining his points by logical arguments, and amongst those in favor of prophylaxis many ingenious schemes have been devised and suggested.

The head of the Naval Medical Corps stamped his approval in the form of a memorandum sent to all medical officers in the navy, outlining certain methods of procedure. This in itself was a step in advance, as it stimulated to action many of the profession who did not consider the plan advisable or practicable aboard ship. Although my experience with compulsory prophylaxis has now extended only a little over a year, the results have been most gratifying, and in submitting this paper it is only with the hope that it will add a step to the ladder of unanimity.

Many advocate prophylaxis, but not to be compulsory, arguing that the æsthetical mind of some of the crew might be morally shocked, and favor the use of "preventols" and similar articles to be sold in the ship's canteen or post exchange for use of members of the crew so inclined to use some sort of a preventive.

Again, others have instituted a scheme of prophylaxis by placing syringes, antiseptics, etc., in the crew's lavatory within reach of the crew, in connection with appropriate instructions, and pointing out to the men the pitfalls of carelessness and negligence.

This method has the disadvantages that the medicines and syringes so placed haphazardly soon disappear, being appropriated by members of the crew suffering with gonorrhœa, taking the syringes and treating themselves, of which the surgeon is kept in ignorance.

To combat venereal disease along these lines is simply using one-half of the charge, such measures falling short of the mark. All men will not listen to instructions or suggestions, neither do all realize the necessity of precautionary measures. The word of advice has fallen upon barren ground and greater force is necessary to act upon these men. The paramount links of the prophylactic chain—"control, supervision, and record"—have been neglected. The medical officer does not know the true venereal record of the crew. Such plans of action soon fade into uselessness, as some form of stimulation is necessary to keep prophylactic treatments alive and to gain results.

The keeping of a "restricted list," a most important pillar in a well planned system of prophylaxis, seems to be out of favor among some naval surgeons, on the grounds that it tends to conceal venereal diseases among the men. In my opinion, every member of the crew suffering with any form of venereal disease should be restricted to the limits of the ship until cured, invalidated to a hospital, or discharged from the service. To allow shore liberty to men suffering with venereal disease is against all moral teachings, as they must contribute to a certain extent to the spread and predominance of venereal troubles, endangering others, also themselves. Syphilis, the bane of mankind, would be greatly reduced in the navy if men suffering with abrasions, herpes, or chancroids were kept on board until contiguity of preputial tissue was restored. These men do not realize the danger of such slight lesions. They do not regard a simple vesicle or papule at all seriously. To their minds, the trouble is too trivial to report to the surgeon, or they may lose their liberty by being restricted on this account, so they go ashore, and we wonder how syphilis can be so prevalent. With a well-regulated system of prophylaxis, involving frequent and routine examination of all liberty parties and all members of the crew, there is no question but that admissions for syphilis and other venereal trouble would be greatly reduced.

The only way for a surgeon to tell if men have these abrasions or are concealing venereal trouble and treating themselves is to frequently examine them. He must have access to the liberty list, examine men frequently, and without this control or knowledge of the cleanliness of the men the value of compulsory prophylaxis is lost.

In the fall of 1908 while stationed at New Orleans, realizing that the percentage of venereal trouble among the men was too high, I made efforts to reduce this percentage by instituting a system of prophylaxis.

The personnel of the station consisted of 18 sailor men and about 66 marines. During the fall of 1908 the men were given several talks as to precautionary measures, and urged to apply for prophylactic treatments at the yard dispensary. For three weeks following 23 men applied for such treatments, but gradually the number of applicants declined, the men losing interest in the treatments. During these three weeks no venereal trouble broke out, and with the decline of applicants the venereal cases again increased. Liberty was freely granted, the limits of the station ended nowhere. Under these conditions control of the men was necessary and in endeavoring to impress upon them the importance of prophylactic treatments, the aid of the commanding officer was sought. The interview with this officer resulted in the publication and posting of the following order.

1. Men who have had intercourse or have been exposed to venereal infection in any way will report immediately upon their return to the barracks to the medical officer or his assistant on duty, at the sick bay.

2. It is important that men so exposed report for a preventive treatment at least twelve or eighteen hours after contact, as a delay in treatment is less liable to prevent disease.

3. Men will be examined at frequent intervals by the medical officer, and any man found concealing venereal troubles will be reported to the commanding officer.

4. No reports are entered on the sickness and disability sheets of the enlistment records in carrying out preventive treatments.

5. Men are informed that by reporting promptly and cooperating with the medical department in receiving preventive treatments they stand little chance of contracting venereal diseases and keep their body, record, and surrounding clean.

(Signed) _____

Captain _____, U. S. M. C., Commanding Marines.

Approved :

Commandant.

At the time that the order was published all men were examined and carefully instructed as to the intentions of the order. During the first month after publication of the order 56 out of 66 men took the preventive treatment, with no developing venereal trouble. This good record has continued, as I have been advised that up to September 1 following over 500 applications of the treatment, not a single case of venereal disease has developed or been detected at that station for the past five months.

The prevalence of venereal disease in New Orleans is notorious, and one has but to visit the charity clinics or talk with men working with genito-urinary diseases to comprehend the amount of venereal trouble in the city. Under such conditions the above figures are most gratifying.

On May 23, 1909, I was ordered to the U. S. S. *Salem*, and immediately took up the question of compulsory prophylaxis with the commanding officer. The scheme proposed received his approval and indorsement, and credit is due him for sustaining the method by strict disciplinary measures when required. The following order was accordingly published :

Men who have had intercourse or have been exposed to venereal infection in any way, will, within twelve hours after returning to the ship, report at the sick bay for preventive treatments. By thus cooperating with the medical department men can save themselves much needless trouble and in some cases permanent disability. During the past year 159 men were discharged from the service on account of venereal disease, and 8 died from the same cause.

This going to the sick bay for preventive treatments is not entered on a man's record as sickness; it is merely an effort to keep himself free from disease. Examinations will be held at frequent intervals and any man found concealing venereal disease will be reported for action by commanding officer.

Men should take into consideration not only their own well-being, but also the fact that other members of the ship's company may contract the disease through no fault of their own, but through neglect of others.

By order of the commanding officer.

(Signed)

U. S. N., Executive Officer.

This order was read to each division by the divisional officers, and also posted on the bulletin board. Every man aboard ship was then examined individually by me for evidence of venereal trouble. Men reported in sections of 20, and before the examination was taken up, I spent from fifteen to twenty minutes on each section, explaining to them the danger of venereal disease, the nature of the preventive treatment, and the necessity of reporting promptly after exposure. These examinations occupied five days and disclosed 32 cases of gonorrhea, 5 syphilitics with well-defined secondary lesions, and 6 with a syphilitic history. These cases were promptly put on the restricted list and placed under proper treatment.

Now, knowing the general condition of every man aboard ship, the next step was to control the liberty parties and examine each day every man in the liberty party, which was gained by the following order:

All men, except chief petty officers, will not be allowed to go ashore on liberty until they have been examined by the medical officer.

Liberty men will report at the sick bay between 12 and 1 p. m. each day.

By order of the commanding officer.

Lieutenant-Commander, U. S. Navy, Executive Officer.

From the above it will be seen that the prophylactic system as carried out aboard this ship is as follows:

Every liberty man is examined daily before going ashore. Liberty lists are sent to the sick bay, and men found suffering with any venereal trouble, such as abrasions, herpes, chancroids, scabies, etc., find their names scratched off the liberty list and added to the restricted list. If nothing is found they are checked "Examined." At 1 p. m. the liberty list is sent to the officer of the deck, and only men leave the ship whose names have been checked at the sick bay.

Men returning from liberty and who have been exposed to venereal infection of any nature, report of their own accord at 8 a. m. the following morning to the hospital apprentice in charge of the isolation room, and are given a prophylactic treatment. This consists of washing the penis and soaking it for five minutes in a 1:1000 bichloride solution, followed by an injection of 2 per cent protargol solution held in the urethra for five minutes by the clock and this followed by an application of 30 per cent calomel ointment. The entire treatment takes about seventeen minutes of each man's time. This method of

treatment differs slightly from that outlined by the bureau, but as I used it with such excellent results in New Orleans, and the method of retaining the germicidal fluid by injection instead of simply irrigating the urethral canal seemed more efficient, I have continued its use. The injections are taken with the ordinary penis syringe, one holding at least three or four drachms being preferred. This amount of fluid injected into the urethra slightly distends the canal, and the retention of the fluid with the distension seemed to me more positive in effects. Another advantage is that men themselves handle the syringe under the instructions and supervision of a trained hospital apprentice.

This treatment is not entirely satisfactory on account of the irritating qualities of protargol. I find that with some men even a one-half per cent solution causes distress, and the same is true with silver nitrate, silver iodide, and other silver salts, commonly used in prophylactic treatments. The addition of mucilagenous substances to hold these salts in suspension or with the idea of lessening irritation I have found unreliable. Argyrol when used in strong solution has given me very satisfactory results, but the allowance of the drug is so small that as yet I have never been able to obtain a supply to meet the demand, and for this reason it can not be considered as a routine treatment unless a liberal amount of this expensive drug is furnished to the ships.

To use any drug that has irritating qualities and causes pain is decidedly disadvantageous. Men will not report as freely or give their cooperation in treatments that cause pain. This in itself is a very important factor, as it is necessary to use as painless a method as possible. The irritation following an application of 2 per cent protargol in some cases is severe enough to excite a nonspecific urethritis.

I have also used with success irrigation of the anterior urethra with hot permanganate solution. This method causes little or no pain, but has the disadvantage that it must be given by a trained attendant and only one case can be treated at a time. On mornings when from 30 to 50 men apply for a prophylactic treatment the matter of individual attention and expediency is a great factor.

Although all measures as commonly used do good and give results, the ideal treatment in my opinion has not yet been realized under present service conditions.

The ideal treatment ought to consist in the administration of some drug that:

1. Is a reliable germicide.
2. Has no irritating qualities.
3. Can be given by ordinary penis syringe to expedite handling of a large number of applicants.

4. Is always on hand and supplied in liberal quantities.
5. Will not stain clothes or hands.
6. Is nontoxic.

A record book is kept of all men taking the prophylactic treatments with the following data:

Name.	Rate.	Previous venereal history.	Exact time of exposure.	Exact time prophylaxis.	Remarks.
Jones, P. L.	C. P.	Gonorrhea, March, 1908.	11 p. m., June 13, 1909.	8:30 a. m., June 14, 1909.	
White, R. L.	O. S.	Negative	10 p. m., June 24, 1909.	9 a. m., June 28, 1909.	Gonorrhea, July 1, 1909.

To accurately carry out this system all men must be examined at frequent intervals, in order to ascertain if certain men not going on liberty, and therefore not examined with liberty parties, are suffering with any form of venereal trouble. The enlisted personnel of this ship comprises about 350 men, of whom 100 are special first-class conduct men, 150 first-class conduct men, the balance being classed.

This number of special first class and first-class men has remained about constant since the ship was commissioned. The liberty granted to the men on this ship is very liberal, and as the special first class and first-class men go ashore every other day it will be seen where some of these men may be examined from six to fifteen times a month. To keep track of the men who do not go ashore very frequently and to make sure that no venereal disease exists among them, as they are the men that might not be examined even once a month and do not appear with the liberty party even if entitled to liberty, I devised the following card scheme to keep myself informed:

JONES, JOHN, SEAMAN.

[The ciphers appear in red in the original.]

Month.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
June					x		x	0																							
July				x	0				x	0																					
August	0		x																												
September			x					x	0	x																					
October																															
November																															
December																															
January																															
February																															
March																															
April																															
May																															

A card is made out for each member of the crew and filed alphabetically. At the close of each day the hospital apprentice in charge of the venereal room for the current month takes the liberty list and

checks off each card, placing an "x" in the proper square on that man's card. Should the man report the following morning for a prophylactic treatment a red circle is put on his card.

Every two weeks I go over the records, and men whose cards show no liberty for that time are summoned to the sick bay and examined; a clear card for that time means one of three things:

1. He is restricted on board by punishment or on account of venereal disease.

2. He did not desire liberty even if allowed.

3. Allowed liberty but stayed aboard to avoid examination required before going on liberty on account of concealed venereal disease.

This system works very satisfactorily and I find it a simple matter to keep accurate data. The cards inform me as to frequency of each man's liberty, number of examinations made, with number of prophylactic treatments for the two weeks.

When venereal cases are discovered that have not taken the prophylactic treatment, reports are made to the commanding officer. During the past four and one-half months I have had occasion to make reports on only three cases. These men were discovered with acute gonorrhea, had not taken the prophylactic treatment and were punished by summary court-martial for the offense. These cases set an example for the rest of the men who now realize the flagrancy of disregarding the order.

The value of any plan or scheme depends upon results gained.

As applied on shore at the naval station, New Orleans, not a single case of venereal trouble developed during the five months that the treatments were given.

During my four and one-half months' service aboard this ship I have had no new syphilitic cases appear and only 6 gonorrheal cases have developed; of this number 3 cases already mentioned did not take prophylactic treatment and were punished. Two men took the prophylactic treatment within twelve hours after exposure and developed specific urethritis on the third and seventh days. The remaining case broke liberty eight days and returned on board with the disease developed.

During this period liberty has been given at Funchal, Madeira, Canary Islands, Salem, Gloucester, and Boston, Mass., and New York City during the Hudson-Fulton celebration. Covering this time there have been seventy-eight liberty days and over 5,300 liberty men have been examined.

Considering the number of men allowed ashore on liberty in ports mentioned and knowing that only 2 cases of gonorrhea have developed out of this number after taking precautionary measures, the

result is most gratifying and must be attributed to prophylactic methods as employed on board.

The task of constantly examining liberty parties may bring up the argument that on larger ships with a larger personnel the scheme is not practical. To make the scheme practical the medical officer must train and instruct the hospital corps men in these duties; after the men are properly trained and instructed the duties of the medical officer are purely supervisory. The actual time devoted to the method consists in looking over the cards twice a month, which takes about fifteen or twenty minutes. All of the work ought to be done by members of the hospital corps, as men feel embarrassed in the presence of an officer. In cases of doubt, when men are examined, the hospital steward makes a specimen for microscopic examination, submitting this to me for examination and investigation.

When the plan was first instituted I personally examined all liberty men; later the duties were delegated to the hospital corps men under my supervision until I was satisfied that they had become proficient in the work. Now all of the examinations are conducted by the hospital steward or the senior hospital apprentice.

My observations under this system have convinced me that:

1. Hospital corps men can be trained under proper instruction to examine liberty parties with expediency and thoroughness.
2. Men do not object to frequent examinations.
3. Some stimulation is necessary to get the men interested in the scheme and to make them realize the necessity of treatments.
4. Men feel grateful for interest taken in combating venereal disease and soon give their cooperation.

MEDICAL CONDITIONS IN THE FIJI ISLANDS.

By Passed Asst. Surg. R. A. BACHMAN, U. S. NAVY

Suva is the largest city in the Fiji group, situated on the island of Viti Levu. Its population numbers about 1,500 whites and 20,000 natives. The natives are Fijians, Samoans, and low-caste Indians. The climate is very much like that of the Philippine Islands and Guam—very warm—with the year divided into a rainy and dry season. Being south of the equator the seasons, of course, are the reverse of ours.

The medical work, including quarantine and city sanitation, is done by corps of physicians and surgeons employed under the British civil service, and they may be transferred from one post to another.

Only one physician in Suva has a private practice. Among the official positions is a medical officer of the port, city health officer, and two physicians at the colonial hospital.

This hospital is located on the outskirts of the town on a piece of high ground overlooking the harbor. The city jail and a small insane asylum are located on the same tract of land, which is at least several hundred acres in extent.

The hospital itself consists of several buildings, constructed not exactly on the pavilion plan, but following along very similar lines. There are separate buildings for natives and whites. The operating room and surgical ward is located in a separate building, and special wards exist for the treatment of tuberculosis (open air), yaws, and the various fevers. A small laboratory occupies part of the building in which the operating room is located. This latter is not at all modern, but nevertheless well lighted and capable of being rendered safe for all kinds of surgical work.

Doctor Hunt, the assistant surgeon, took me over the buildings and grounds and showed me the more interesting of the cases under treatment at the time. Tuberculosis exists principally among the Indians and presents no features of special interest. Ankylostomiasis is frequently met. Lumbricoid worms, I would say, are prevalent as they are in Guam, where nearly all the natives are at some time found to be infected. Quite a good deal of elephantiasis occurs, the cases being very much like the Samoan ones; Fijians and Samoans are the victims. I saw an operation for the removal of an elephantoid scrotum, and the technique was similar to that described by Surgeon Fauntleroy—namely, the lateral incisions for flap formation. I was told that a French surgeon in one of the near-by islands had been supplied by the Pasteur Institute with an antistreptococcus serum in harmony with the theory that elephantiasis is of streptococcic origin.

All cases of leprosy are isolated and kept in a camp. All cases of yaws are also segregated and sent to the hospital for treatment, which consists of the administration of potassium iodide. A systematized rat crusade has been established since the discovery of plague in Sydney. Other diseases of common occurrence are typhoid fever, beriberi, and dysentery with its sequel, liver abscess. No malaria exists, and the only mosquitoes I saw were culex.

One incident is worthy of special mention. In looking over some of the cases of yaws with Doctor Hunt, I saw an old woman with the typical nasal deformity of rhinopharyngitis mutilans or gangosa so frequently encountered in Guam.

I asked Doctor Hunt what his diagnosis of the case was, and he told me that it and similar cases were considered a nasal manifestation of yaws. Furthermore, he stated that the disease first showed itself in the soft palate, uvula, and tonsils of children, and the destructive process worked outward. Potassium iodide stopped the ravaging progress of the malady. Now this is the exact picture of a



CASE OF GANGOSA (?) IN FIJI.

disease usually considered as belonging exclusively to Guam (Surgeon Stitt, I believe, reported one doubtful case elsewhere), and not classified as a form of yaws, but a disease *per se*.

I asked to see some of the throat lesions, but unfortunately only one case was available; that one was exactly like the cases of *gangosa* which I had seen in Guam. Doctor Daniels during his stay in Suva studied these cases and classified them as yaws or one of its sequelae.

The accompanying photograph shows characteristically the external appearance of this type of nasal destruction. This Fijian previously suffered from a very extensive lupoid ulceration of the nose and pharynx. It will be seen from the photograph that the condition has involved the exterior of the nose as well as the interior, and the absorption of the septum has produced a sinking of the bridge of the nose very similar to that found in syphilitic disease. There is extensive involvement of the rhinopharynx, and a perforation of the soft palate. This condition is generally regarded here as a manifestation of *frambœsia* which affects the vast majority of the natives.

There are one or two cases in the hospital at present where the exterior of the nose is involved in a lupoid ulceration which has extended also up the nares. The condition yields readily to antiseptic lotions, dilute mercurial ointments, and potassium iodide internally.

There is now being treated a boy about 10 years of age who was admitted for aphonia of a month's standing. He has pharyngeal ulceration and some swelling of the vocal cords. Under potassium iodide the ulceration and the aphonia are both disappearing.

SUGGESTED DEVICES.

CONSTRUCTION OF AN IMPROVISED INCUBATOR.

By Passed Asst. Surg. F. G. ABEKEN and Asst. Surg. R. CUTHBERTSON, U. S. Navy.

This incubator was devised after one in use at J. J. Hogan's laboratory in Vallejo, Cal. It can be constructed on board ship at the nominal expense of \$5. This electric-heating incubator was improvised by using a bake oven as ordinarily used on a single-burner gas stove. To maintain an even temperature the oven was lined with a nonconducting material (asbestos). The door has a mica window so that the electric lights may be observed without opening the door. Tubulation for thermometer is also provided for.

The thermo regulator consists of german silver, and accurate adjustment can be made through a set screw to regulate a constant and precise temperature to within 1°.

Persistent efforts and patience were required to attain the proper dimensions of the springs, so as to react delicately to heat and cold.

The accompanying sketch will explain the thermostat, which is attached with the two 16-candlepower incandescent heat generators to an appropriate size wooden bracket that is placed within the oven or so-called incubator.

S is metallic spring of german silver that expands or contracts readily to the influence of heat or cold. Dimensions, 22 by 5 c. m. by 1 m. m.

W is a thin strip of wood to steady the spring; length, 20 c. m.

D is screw securing spring S to wooden bracket A.

L is a copper lever with its fulcrum screw at F. Dimensions of X, 2.5 by 5 c. m. by 1 m. m. Dimensions of Y, 14.3 by 5 c. m. by 1 m. m.

P is German silver plate with fused platinum drop on it.

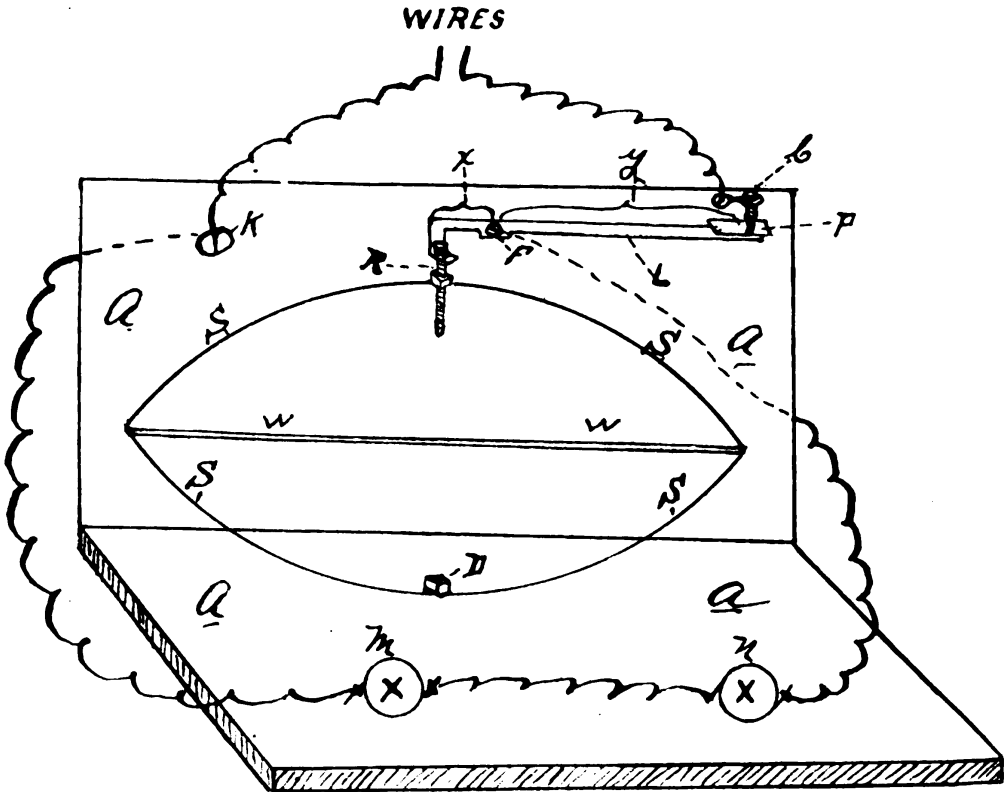
C is platinum pointed contact screw.

R is set screw ($\frac{1}{32}$) for adjusting tension of spring.

Z is distance of 9 c. m. between springs.

M and N are 16-candlepower incandescent lights; at K and C are hole plugs to attach the electric wires.

When spring S expands from the heat of two incandescent lights the set screw R bears up on lever X, which breaks the contact or circuit at P; the incandescent lights go out. When spring S has cooled off sufficiently it contracts, thereby pulling down lever X through set screw R and making contact or circuit at P; the incan-



descent lights are aglow again. The tension of the spring can be so adjusted by the set screw R that the spring will react to any temperature desired.

This incubator has given satisfactory results on board ship in making all our cultures and vaccines.

A GALL-BLADDER DRESSING.

By Hospital Steward H. L. GALL, U. S. Navy.

Anyone who has ever been called upon to apply a gall-bladder drainage where an ordinary drainage tube or catheter has been used instead of a "Mixer" tube, or after a Mixer tube has given way, knows what a difficult task it is to keep the drainage tube in place; also to prevent its kinking and to get a perfect drainage. In trying to overcome these disagreeable features the following dressing has been used with good success at the Naval Medical School Hospital.

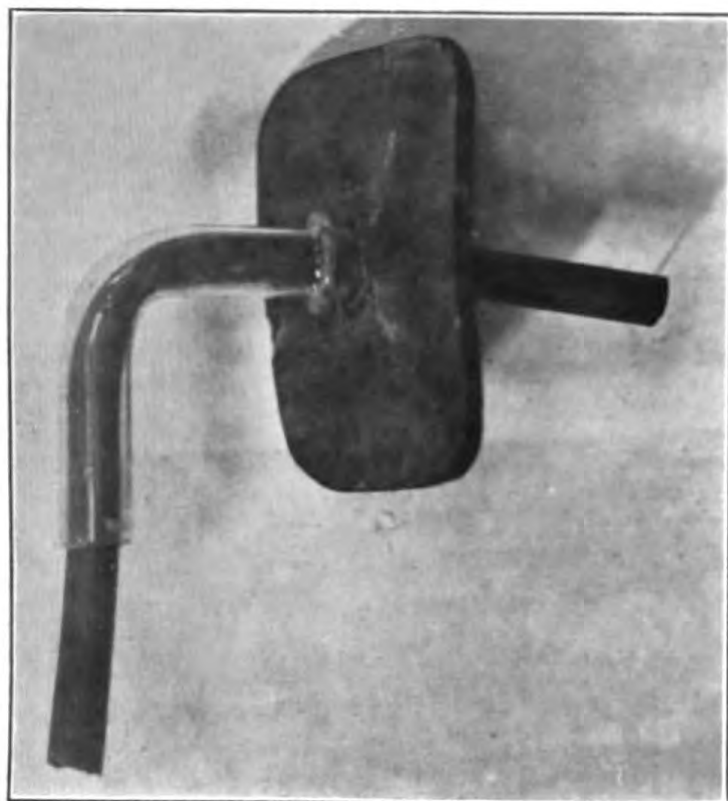


FIG. 1.

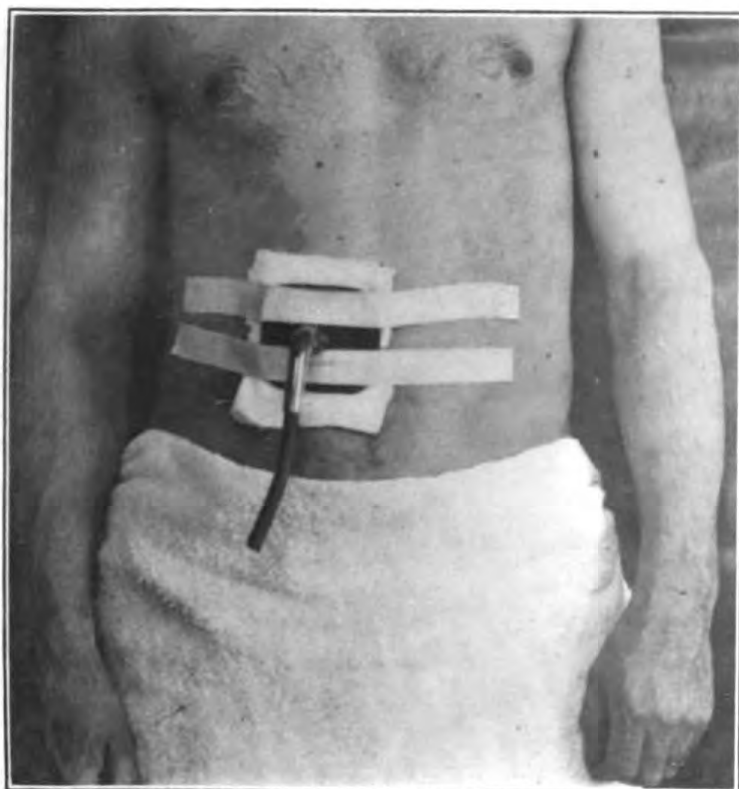


FIG. 2.

GALL-BLADDER DRESSING.

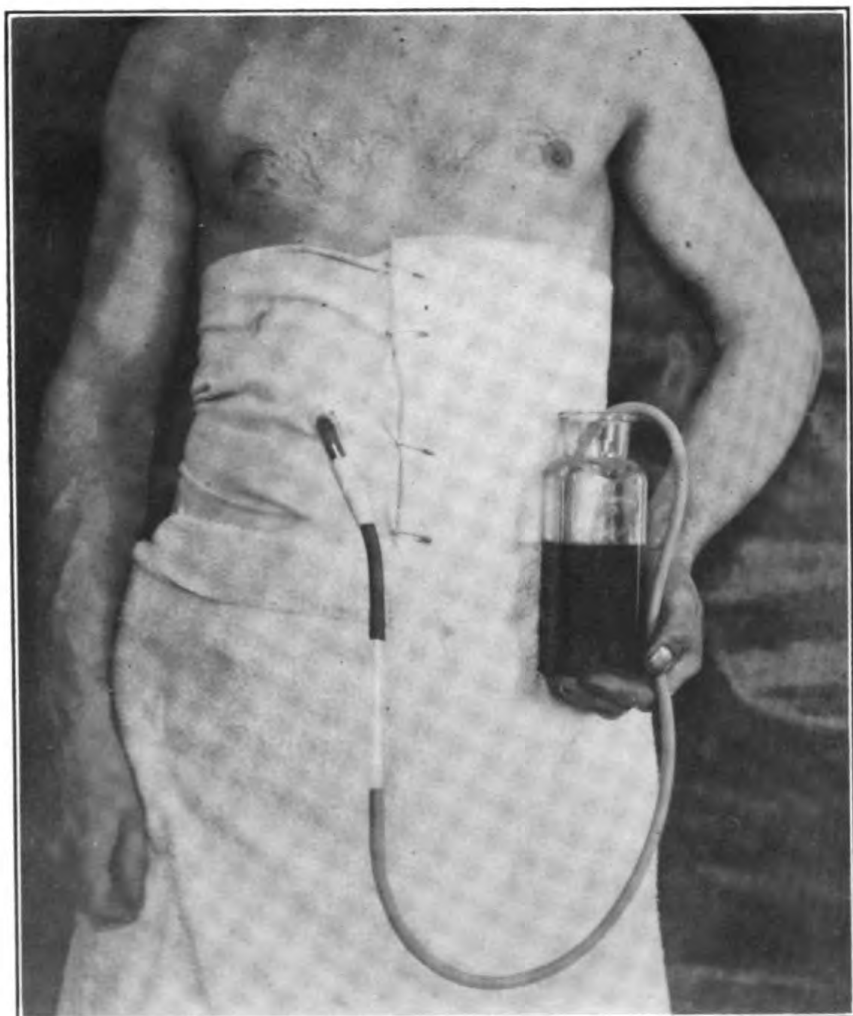


FIG. 3.
GALL-BLADDER DRESSING.

The articles needed are a Mixer tube, a piece of rubber packing 4 inches square by three-sixteenths of an inch thick with a hole in the center large enough to fit the Mixer tube snugly when placed between the flanges of the tube, and an ordinary drainage tube small enough to pass through the Mixer tube. These articles when assembled, as seen in figure 1, are then sterilized by boiling.

In applying, the following steps should be taken:

1. Adjust the drainage tube so that when the dressing is placed in position no discomfort is caused by the tube being too far in as to produce pressure on the bladder. When this point is found, secure the drainage tube to the Mixer tube with adhesive plaster. (Fig. 3.)

2. If the wound is larger than can be filled by the drainage tube, pack gauze snugly around it, which can be done by raising the edge of the rubber packing. This can soon be dispensed with, as the tissues soon contract and fit close around the tube. A few layers of gauze should also be placed under the rubber packing to prevent any irritation from the Mixer tube.

3. After placing in position, the dressing is held firmly by the aid of two straps of adhesive plaster placed across the rubber packing, as seen in figure 2, which shows the dressing in position.

4. Now put on a dressing of gauze and cotton held in position by a binder, letting the Mixer tube protrude through it.

5. Fill the drainage tube and gall bladder with sterile salt solution by the aid of a Davidson syringe, also fill the rubber tube that is to connect the drainage tube with the receptacle. Having done this, connect the two with a piece of glass tubing, which serves not only as a connecting link, but is also valuable in enabling one to see whether or not the dressing is working properly. After placing the distal end of the rubber tube in the water of the receptacle, the salt solution should be seen to stay in the tube at the glass. If this is the case, one is sure of a good drainage, for it shows that a perfect syphon has been formed. Figure 3 shows the dressing complete.

This dressing has been used with perfect success in cases where drainage has been kept up several months and the patient walking around with the receptacle in his pocket.

CLINICAL NOTES.

REPORT ON A TYPHOID CARRIER.

By Surg. C. S. BUTLER, U. S. Navy.

In the latter part of July, 1909, there was referred to me for examination, by Asst. Surg. J. A. B. Sinclair, U. S. Navy, a patient who for a number of years had passed cloudy urine.

The patient gave a history of having passed a stone from the right kidney some fifteen years ago. He was not a robust individual, but was a fair average specimen of the working class. Physical examination was practically negative. Examination of his blood showed it to be normal. He had applied for examination because of constant passage of cloudy urine and also because of stiffness in the small of the back.

A specimen of urine was passed and in the fresh state showed a slightly acid reaction and a marked cloudiness, due to the suspension of minute white flocculi. Aside from this there was nothing remarkable about the urine macroscopically. Microscopical examination of the sediment showed the presence of a considerable number of pus cells and masses of clumped bacilli, which stained negatively with Gram. Some of the washed sediment was inoculated into guinea pigs; the animals were all dead on the following day. Owing to the warm weather, decomposition had set in by the time that it was noticed that the animals were dead, and it was therefore deemed useless to examine their tissues. Plates made from the fresh urine showed on the following day what proved to be micrococcus aureus and a motile bacillus which gave all the culture characteristics for *B. typhosus*.

The patient was induced to come to the laboratory and furnish another specimen of his urine. At this time it was ascertained that his blood agglutinated the laboratory cultures of *B. typhosus* and also the bacillus isolated previously from his urine in dilution of 1 to 100. It has since been ascertained that this organism agglutinates with the serum of typhoid patients, and the serum of rabbits immunized to the bacillus obtained from this case agglutinates all the strains of typhoid bacillus in the laboratory in high dilutions, so that

there can be no doubt that the organism in question is the bacillus of Eberth.

When the patient came to the laboratory the second and last time, about the 28th of July, it was ascertained that he had had typhoid fever in 1882, and from questioning the man there is no doubt that what he had at that time was typhoid fever. Since July 28 it has been impossible to see this patient. I had hoped to be able to locate the seat of the lesion, whether in the kidney or bladder, and to try the effect of treatment, but the man can not be induced to put in an appearance at the laboratory. He was warned that he is a menace to the community. He stated that there had never been any typhoid in his immediate family.

If we can accept the time of his having typhoid fever as coincident with his becoming a typhoid carrier (and this seems to be the criterion for former cases), then this man has passed typhoid bacilli in his urine for twenty-seven years. This seems borne out by the fact that he passed cloudy urine for a great many years. He could not precisely fix a date when it began but stated that it had been all of fifteen years.

Not having had an opportunity to look up the literature on this subject I can not state what the time record is for urine-typhoid carriers, but I believe that this is one of the longest, if not the longest, case on record.

On account of the ease with which bacillus-bearing urine can contaminate food, fingers, water, etc., urine-typhoid carriers are a special menace to the community in which they live, and there should be some provision for handling such patients, so that the danger of infecting others could be reduced to a minimum.

REPORT OF TWO CASES OF THE VARIOLA FORM OF SYPHILIS.

By Surg. F. M. FURLONG, U. S. Navy.

The variola form of syphilis, as its name indicates, is a form of syphilis in which the eruption and some of the other symptoms bear a resemblance to smallpox.

I regard this affection of great importance, as failure to recognize it may cause all the inconvenience of being quarantined for smallpox, and, on the other hand, the mistaking of smallpox for its syphilitic prototype may result in very disastrous consequences. At any rate it is an affection that requires a great deal of serious consideration.

The following is an account of two cases which have occurred in my service on the U. S. S. *Vermont*:

Case I.—C. W., Fir. 1st cl., aged 23, negro. On Mar. 15, 1908, this man reported to the sick bay with a venereal sore on the penis, which later on was

accompanied by glandular enlargement, especially in the groins. On Apr. 4 he reported with a papular eruption over the chest, back, and upper extremities. Temperature 102° F., and some pain in head and back. There was a good vaccination scar. A few days later some of these papules became vesicles, filled with a turbid fluid, while many others became pustular. In the meantime, new papules occurred on the head, face, and lower extremities, so that at one time the eruption could be found in all three stages. To further complicate matters, a few of the pustules were umbilicated. Febrile symptoms accompanied the eruption. As the case resembled smallpox he was isolated, and on Apr. 14, there being no appreciable change, he was transferred to the hospital ship *Relief*, with a diagnosis of syphilis, which was later confirmed by the medical officers of that vessel.

Case II.—P. D., junior off. cook, age 32, Filipino. Admitted on August 2, 1909, with several sores on penis, accompanied by enlarged glands in the left groin. On August 20 a number of papules were noted on the back, all of which were distinct and had a "shotty" sensation to the touch. Temperature was usually in the vicinity of 102° F., and he complained some of headache and muscular pains in upper part of back. Though there was a vaccination scar, it was such a poor one that it was practically of no value from a diagnostic standpoint. As the case looked suspicious, he was isolated. The next day papules appeared on arms and chest and a few days later over the face. In the meantime the papules on the back had changed to vesicles and pustules; occasionally an umbilicated vesicle was noted, especially on the arm and forearm. Up to this time no eruption had occurred on the legs, but a few days later they become involved and went through the other stages. At one time one could see papules, vesicles filled with an opaque fluid, pustules, and healed lesions. On August 20 an opportunity came to send the patient to the hospital with a diagnosis of syphilis, which was subsequently confirmed.

These two cases, though very interesting, were very puzzling. Both presented many features in common with smallpox, and yet there were enough differences to cause doubt.

In Case I the man appeared with the eruption while the ship was in Magdalena Bay, so that a period of thirty-five days had elapsed since leaving the last port. There was a distinct history of venereal disease, a good vaccination scar, and the peculiar behavior of the eruption; that is, all three stages at one time. On the other hand, the eruption simulated smallpox even to the extent of being umbilicated in a few places, and there were also febrile symptoms and pains in the head.

The second case was still more puzzling. There was no long period between possible exposure to smallpox and the appearance of the eruption, and though there were venereal sores on the penis there was no general glandular enlargement. The vaccination scar was such a poor one that no dependence could be placed upon it. As in the first case, the eruption was very much like smallpox. On the other hand, the eruption was unlike smallpox because of its erratic behavior, in that all stages were present together and that the face was one of the last places to be involved.

In these cases the clue to their solution lay in the fact that both men had distinct venereal histories only a short time before the

constitutional symptoms appeared, but it must be borne in mind that persons seized with smallpox may also have venereal histories, one case of which I have seen.

NOTES ON CASES TREATED BY VACCINES.

By Medical Director M. H. SIMONS, U. S. Navy.

The following cases illustrating the effects of vaccines used in treatment at the United States naval hospital, Mare Island, Cal., may be of interest to the readers of the Bulletin:

No. 1.—S. P., age 56, was admitted with neurasthenia December 24, 1908. Has been under treatment at a sanatorium; has been steadily failing for some months; patient states that he had been treated for typhoid fever at the naval hospital, Brooklyn, in 1893, and was discharged well, but after his discharge there was at times a slight rise of temperature. In 1894, while on duty at Washington, D. C., had what was called another attack of typhoid, and has had since that time numerous attacks of "grippe" and "malaria." No microscopic examination of the blood had been made during this time.

When admitted to this hospital patient was emaciated and the spleen was much enlarged. Blood count showed 35 per cent polynuclears, 60 per cent lymphocytes, red cells and hæmoglobin normal. No parasites of malaria, but the Widal reaction was positive in twenty minutes. A suspension vaccine of *B. typhosus* was prepared and 50,000,000 injected. The injections were made every two weeks, and the amount was gradually increased to 200,000,000. On admission the temperature was variable, sometimes rising to 103° or 103.5° F. in the evening, normal in the morning; but under the use of vaccine it slowly fell until it was rarely above 100° in the evening and normal or slightly subnormal in the morning; there was a gradual approach to normal. The gain in weight and strength was steady though slow, the digestion steadily improved, and the blood count showed a steady approach to the normal; the spleen slowly decreased in size. From September 1 the temperature was normal in the evening and one-half degree below in the morning, but the patient seemed well in every other way; he tired easily, but recuperated quickly; his strength was good, digestion good, blood count normal, weight normal, so he was discharged to his home October 1, 1909.

This seemed to be an undoubted case of continued typhoid infection, and the diagnosis was changed to "febris typhoides." Since his discharge the patient has remained in excellent health.

No. 2.—F. N. H., P. M., typhoid fever. Admitted August 7, 1909. Widal positive. Seventh day of disease, according to record, temperature was 102° F. at 8 a. m. and 103.2° at 6 p. m. Treatment: Baths, and vaccines of *B. typhosus* 25,000,000 to 33,000,000. After the first three vaccinations and cold baths the temperature dropped slightly in the evening and nearly to normal in the morning. By the twenty-third day in the hospital the temperature was normal or slightly subnormal in the morning to about 99.4° in the evening. Five vaccinations were given, or one every third or fourth day during the active stage.

No. 3.—Z. B. H., typhoid fever. Admitted August 15, 1909. Widal positive. Temperature 103.5° F. in the evening. Vaccines *B. typhosus* every third or fourth day, also baths; five vaccinations, dose as above. After the twenty-second day in the hospital the temperature never rose above the normal in the evening, but was a little subnormal in the morning. Recovery uneventful.

No. 4.—D. H. S., typhoid fever. Admitted September 12, 1909. Widal positive. Temperature 103.8°. This was a severe case, with frequent exacerbations of temperature and diarrhœa. Saline enemata, stimulants, cold packs, etc., were given. Six vaccinations were made, but they did not have the usual noticeably good effect. On the 29th there was a slight relapse, lasting three days. After that recovery was uneventful. Salol and bismuth were given to control the diarrhœa.

No. 5.—P. B., typhoid fever. Admitted October 10, 1909. Complicated with gonorrhœa and acute articular rheumatism. Diarrhœa was present. Salol, bismuth, aspirin, application of ice to joints, urethral injections of potas. permangan. were used. Widal positive. Highest temperature 103.2°. Normal on tenth day; slight relapse on fourteenth day. Convalescence uneventful; gonorrhœa persists. Two vaccinations with *B. typhosus* given. *B. typhosus* was found in the blood.

No. 6.—A. A., pyelitis. Admitted August 30, 1909, from U. S. S. *Denver*, Woosung, China. *B. coli communis* found in urine, and vaccine made therefrom used in quantities of from 25,000,000 to 75,000,000; at first twice, then once a week. Reaction positive and often marked. The urine showed abundant pus cells, albumen, and phosphates. At first there was no improvement, but after a month the pus and albumen diminished and the patient gained in weight and strength. For the last two or three weeks there has been neither advance nor retrogression in the kidney disease. Patient has had operation for decortication performed. For a while he was better, then became worse. The symptoms now point to increasing constriction of the kidney.

No. 7.—J. P. J. R., nephritis chronica. *B. coli communis* found in urine, and vaccine of same used twice a week at first, once a week latterly. Pus cells and albumen abundant; a few casts. Admitted July 27, 1909, and went to duty November 3, 1909. The pus cells and albumen diminished steadily under treatment, and after the first month in the hospital the patient was encouraged to exercise. Walked 5 or 6 miles daily for two or three or more days weekly, made a trip in the Yosemite, etc., and all this did not increase the albumen and pus; his general health and strength increased, but not up to the normal. The patient tired quickly, but soon recuperated. He was at times inclined to take a hopeless view and at other times felt as if he would entirely recover. It is thought that his present arduous duties will cause a relapse. The disease is of over one year's standing.

There was one other case of typhoid fever which died of hemorrhage. It was admitted to the hospital in the third week and died of hemorrhage about ten days thereafter. The vaccines had, however, a beneficial effect for the first few days.

So far as my experience goes the vaccines do not cure many cases, but they certainly materially modify the severity of the disease, notably typhoid fever. The first case noted seems to have recovered, but the two other cases were only modified. There was absence of restlessness, heat thirst, lumbar pains, and cephalalgia, and the patients were thus made very comfortable and the danger of hemorrhage lessened. One case, however, which came in late in the course of the disease (about the third week), had severe hemorrhage and died. Two cases, including this last, did not respond to the vaccines.

In acute rheumatism the vaccine does not seem to shorten or to

cure the disease, but, as in typhoid, the comfort of the patient is greatly increased and the symptoms are modified materially. In my own case, pyorrhœa alveolaris had developed and a culture from the discharge showed only a small organism growing scantily in the blood culture. It was similar to that described in Allen (p. 164) as the *S. rheumaticus*. The vaccine made from this gave prompt reaction. From 25,000,000 to 125,000,000 were given at a time from two to three times a week. Later it was found better to give not over 50,000,000 once a week. At the site of injection a tumor of the size of a chestnut formed; there was a marked redness about 3 inches in diameter and marked tenderness; there was a sense of general fever and muscular stiffness, but no actual rise of temperature; the amount of urine was notably increased. These symptoms lasted for about twenty-four hours and then began to decrease and were followed by a feeling of elation and well-being. There has been no attack of rheumatism since the use of the vaccine and no swelling of the joints or marked lameness followed the walking of 50 miles in the physical test. At first the pyorrhœa was not noticeably affected, but lately it has begun to subside; the gum is growing firmer and the looseness of the teeth is much less.

Quite a number of cases have come to the hospital with a diagnosis of gonorrhœal rheumatism in which the origin is very uncertain. The vaccines in these seem to be very valuable as a means of positive diagnosis; if no reaction follows the *gonococcus* vaccine, then the *rheumaticus* will probably give it.

A case of middle-ear disease of long standing promptly gave way to a vaccine of *B. pyocyaneus*, but the disease returned after two or three weeks and the cure does not appear to be lasting. It may be, however, that a long-continued course will effect a permanent cure.

In one case of chronic middle-ear disease the pneumonococcus only was found and the disease promptly and permanently gave way to the vaccine.

From our experience it appears that better effects are gained by moderate doses rather than large ones and that once a week or even once in two weeks is better than more frequent repetition. There is some probability also that autogenous vaccines will do better in most infections than those from stock cultures. So far mixed vaccines to meet cases of mixed infection have not been thoroughly tried here.

HEAT EXHAUSTION ON THE U. S. S. CALIFORNIA.

By Surg. E. G. PARKER, U. S. Navy.

I have to submit the following report of the effect on the physical condition of the men of the fireroom force produced by hard work during the recent speed trial from San Francisco to Honolulu. Six-

teen men in all were affected, and in 13 cases it was necessary to put the patients on the binnacle list, as they were entirely unfit for duty. Thirteen of these men belonged to the regular fireroom force and 3 were detailed from the deck force.

One case appeared on September 6, 6 on September 7, 3 on September 8, and 6 on September 9. The effects produced were essentially those of heat exhaustion, with signs of general depression, as shown by subnormal temperature and rapid, feeble pulse. Muscular cramps was a universal symptom, chiefly involving the abdominal muscles and those of the extremities. In some cases the cramps were most severe, associated with agonizing pain and amounting to a partial, temporary paralysis.

In one case, that of C. L. B., Fir., second class, the symptoms were alarming; his condition was critical when he applied for treatment; he was in a state of collapse, with temperature of 97.4° F., pulse 140, and very weak. Muscular cramps of the extremities and trunk—at times appearing to involve the diaphragm—were most severe and associated with atrocious pain. The picture was much like that seen in cholera, the cramps appearing to be the result of the rapid extraction of fluid from the tissues, due to severe labor and excessive sweating in the fireroom.

The effects produced may be regarded as chiefly due to excessive labor, since the firerooms were well ventilated and relatively cool, the temperature being from 95° F to 105° F.

As regards treatment: Stimulation (hypodermically) and warm baths would control the condition in most instances, but severe cases of spasm demanded morphine, which acted very well in .014 gm. doses, combined with atrophine.

A CASE OF GUN-SHOT INJURY OF THE KNEE JOINT.

By Surg. RAYMOND SPEAR, U. S. Navy.

J. K., B. M., first class, while cleaning a 32-caliber revolver, accidentally shot himself through his left knee; he was dressed at the time. The bullet entered from the inside (1), traversed the joint, struck the end of the femur, was deflected downward, and lodged in the external lateral ligament. The man injured himself at his home and was taken to a civil hospital where the surgeon inserted a probe into the wound of entrance directly into the knee joint in search of the bullet.

About two hours after injury the man was admitted to the U. S. Naval Medical School Hospital. The knee was shaved and thoroughly disinfected, the contused and powder stained tissues were removed at the site of the wound of entrance. The bullet was removed from its

lodged position as shown by the arrow. An opening was made at (2) into the knee joint, the joint was then flushed out with a 1 to 5,000 solution of bichloride of mercury through this opening to opening (1) with the idea of washing out the infected material that had been introduced by the probe; the bichloride irrigation was followed by an irrigation of hot salt solution. A rubber drainage tube was then inserted at (2) and led through the joint and out at point marked (1), thus establishing through and through drainage.

Daily cultures of the synovial fluid from the joint showed it to be sterile, and the rubber drainage tube was removed on the fourth day. Synovial fluid discharged from the wound of entrance for four days more, then ceased, as all the wounds had completely healed. There was at no time any sign of infection.

In the process of healing some soft adhesions formed in the joint and limited the motion of the joint to a few degrees. Eight weeks after injury, under chloride of ethyl general anaesthesia, these were readily broken up and the joint motion was restored to normal permanently.

The case is interesting from the point of the practicability of disinfecting and rendering an infected joint sterile by irrigations of bichloride of mercury and salt solutions, reenforced by adequate drainage.

The photographs show the different wounds and also the leg flexed just before the patient was discharged to duty.

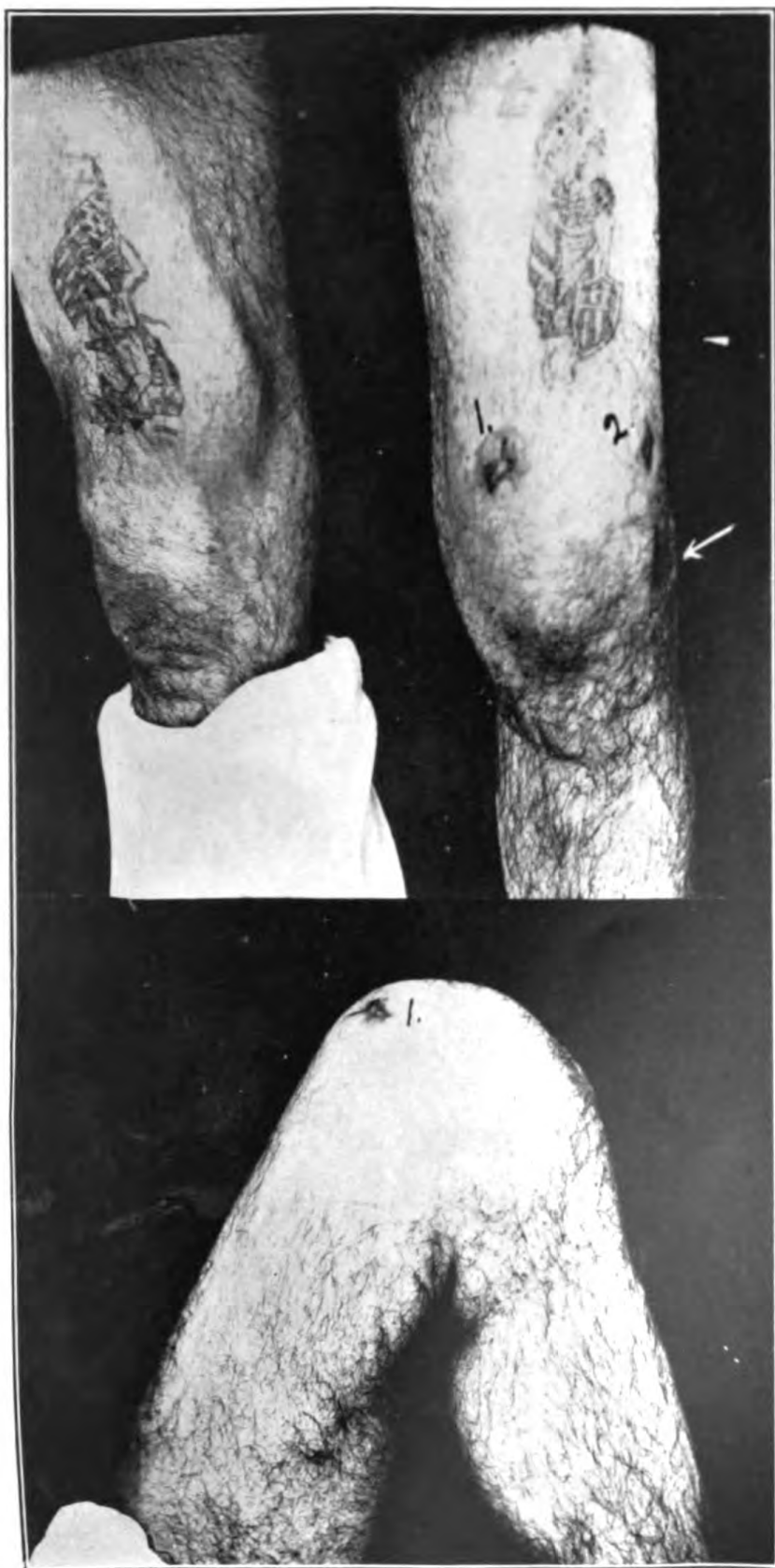
AN OPERATION FOR ECTROPION.

By Surg. **RAYMOND SPEAR**, U. S. Navy.

The photograph was taken four weeks after an operation for ectropion, and shows a flap taken from the cheek (the scar can be seen running downward) and swung over and sewed in position to form a lower lid. The two shot are on the ends of a silver wire which is at the bottom of the conjunctival sac.

The boy on whom the operation was performed was a Samoan aged 18 years. When a child he had had an ulcer on the lower lid of his right eye. In the process of healing, scar tissue resulted and by its contraction caused the lower lid to evert.

Under ether anaesthesia all the scar tissue was removed from the lower lid; a large flap with the base at the outer angle of the eye was swung over and stitched into place. To hold the conjunctival sac down in its proper position a large silver wire was threaded on two needles, the needles were passed down to the bottom of the conjunctival sac, about three-fourths of an inch apart, and then passed



GUNSHOT INJURY OF KNEEJOINT.



OPERATION FOR ECTROPION

directly through the tissues, shotted, and cut off. This left a piece of silver wire at the bottom of the conjunctival sac.

The operative result was excellent. The wire was left in place for six weeks, caused neither discomfort nor irritation, was in every way superior to the lead plates ordinarily used, and could have been left in place much longer if it had been necessary.

REPORT OF A CASE OF AMŒBIASIS.

By Surg. A. E. PECK, U. S. Navy.

The case of J. T. M., U. S. M. C., presents some points of unusual interest, especially in connection with recent advances in our knowledge of amœbiasis and of its prevalence in the United States.

Past history.—He had typhoid at Peking, China, in 1900; since then until present illness he has had good health, with the exception of occasional attacks of "stomach trouble" and slight symptoms of "rheumatism." He was on duty at Olongapo, P. I., from August, 1906, to January, 1907.

Present illness.—Began middle of May, 1909. The first symptoms that the patient experienced were pain in the bladder and considerable pain in the region of the hypogastrium, especially severe after eating, and slight evening temperature. He was placed upon the sick list. Examination of the urine showed it to be quite clear and free from pus. On the last day of May, while at stool, he felt a violent pain in the lower part of his abdomen on the left side. The pain was so severe that it caused him to collapse. He was pulseless, but not unconscious. A few days later something ruptured, and the urine became loaded with pus. On June 12 the patient was transferred to the naval hospital, Mare Island, Cal., where he was treated with injections of vaccine made with colon bacillus. On June 19 the patient discovered feces in his urine and flatus was being expelled through his urethra. A rectal examination was made, and it was thought that the prostate was involved. At this time the temperature rose to 104° F.

On July 2, he consulted Dr. C. G. Levison, of San Francisco, Cal., who made the following examination: "While speaking to the patient he would start suddenly, place his hand to his side, and he explained that this sensation was caused by the passing of gas. This could be palpated as well as heard in the left lower quadrant. Later this flatus would be expelled through urethra. Abdominal palpation revealed an irregular thickening in the region of the sigmoid. This thickening would come and go and was partially due to the contracting intestine, which was dull upon percussion. A rectal

examination did not reveal an enlarged prostate, but a mass, smooth in outline, which occupied a position to the left, extending high up, where it was possible to reach it with the finger. The urine contained particles of feces, and it had a strong fecal odor. During the examination the patient expelled a considerable quantity of flatus through the urethra, accompanied by a characteristic sound.

"Under ether, patient was cystoscoped by Dr. Henry Meyer, which examination revealed feces being extruded through the wall of the bladder. This opening, which was surrounded by hyperemic tissue that extended a considerable distance from the opening, was situated at the upper left side of the bladder. The patient's evening temperature at this time was 104° F. It was evident that an opening existed between the bladder and the rectum. The possibility of malignancy was thought of, but there was nothing suggestive of a neoplasm. Tuberculosis was the condition most naturally considered, but microscopic examination did not reveal the presence of the bacillus of tuberculosis."

On July 8 examination of feces by microscope showed the presence of motile monads, but amœbæ were not recognized. On July 10 the patient's temperature, which for a week had been down to 99°, rose to 102.5°. The quantity of pus at this time was diminished, and rectal examination showed that the mass in the rectum bulged and was more tense and that the abscess was not emptying itself satisfactorily.

The blood examination showed 1,700 leucocytes; hæmoglobin, 85 per cent; polyphornuclear neutrophiles, 59.2 per cent; large mononuclears, 7.2 per cent; lymphocytes, 39.2 per cent; eosinophiles, 4.4 per cent.

Passed Assistant Surgeon Long, Public Health and Marine-Hospital Service, was called in consultation, and he pronounced the condition one of unmistakable amœbic disease. It was then decided to perform a colostomy for the purpose of diverting the fecal current, thereby influencing the entero-vesical fistula and also for the purpose of treating the amœbic condition more satisfactorily.

On July 12 patient had a chill and his temperature rose to 104.6°. The feces contained amœbæ, motile and encysted forms. The next day an enterostomy of the ileum near the ileocæcal valve was performed. The patient's condition was very unsatisfactory, and for a number of days there was a question whether he would survive. July 16 the liver was found to be enlarged, extending to the nipple line; and by the advice of Long, ipecac treatment was commenced, 30 gr. in salol-coated capsules taken at night. Two incisions were made in the walled-off section of gut, so that both upper and lower bowel could be irrigated daily, commencing with quinine bisulphate 1 to 5,000 and increased gradually to 1 to 500 solution.

The patient began to improve rapidly. The urine soon became fairly clear, the liver decreased in size, temperature and pulse became normal, and the patient increased in weight. The opening into the bladder remained patent, however, during the month of September, for numerous encysted amœbæ were still to be found in the urine.

On October 26 the rectum was inflated with gas and a cystoscopic examination made. No bubbles were seen and there were only a few shreds of mucus at the site of the opening. Washings from the lower bowel still showed some encysted amœbæ.

At the present time, October 31, the patient looks and feels well, weighs 180 pounds, is able to take long walks, and is only slightly inconvenienced by the presence of an artificial anus. Treatment now consists in daily irrigation of quinine, upper and lower bowel; daily bladder irrigation of boracic acid, followed by the instilling of 20 drops of 10 per cent argyrol, and internally urotropin, gr. 5, t. i. d., and pancreatin, gr. 3, in salol-coated capsules after meals. This treatment will be kept up for a month; then he will have normal salt irrigations for a week and daily tests will be made for the presence of amœbæ. Resection of the intestine will be undertaken after amœbæ have entirely disappeared.

The dressing devised by the trained nurse, who has been in constant attendance on the patient, merits description, as there has occurred no irritation of the skin from discharges and no offensive odor has at any time been noticeable. After dusting with powder region of the wound, three layers of rubber dam are applied by making a hole through which the mass of protruding intestine is drawn. A layer of absorbent cotton comes next, and the whole is folded into a neat packet containing the artificial anus. A folded bath towel passing around the body and pinned over the dressing affords additional protection.

Amœbiasis is without doubt very prevalent on the Pacific coast, although as yet the disease is not generally recognized by physicians, as its symptoms are not often those of typical dysentery. In the last three months in San Francisco there have occurred three cases similar in many respects to the one here reported.

Since December 1, 1908, about 130 cases of amœbiasis have been admitted to the United States marine hospital. Of these, 52 became infected in the United States, 28 per cent suffered from constipation, 26 per cent from diarrhea, and the remaining 46 per cent had alternately constipation and diarrhea. Between 20 and 30 of these cases had some form of osteo-arthritis, mostly of the spine, but also of the hip, shoulder, etc., and all suffered from intestinal indigestion. Long, of the Marine-Hospital Service, believes that chronic rheumatism, sciatica, lumbago, etc., are all due to intestinal indigestion, often caused by the presence of amœbæ; and some remarkable

cures of these conditions have been effected by him by treating the indigestion. Examination of the stool of every patient admitted to the marine hospital is made as a matter of routine; diet and treatment are largely governed by the findings of such examination. At least one other hospital in San Francisco has recently adopted this practice. When it becomes more general, doubtless considerable light will then be thrown upon many obscure conditions.

[*Note.*—Under date of December 4, Surgeon Peck reports bowel washings free from amœbæ since last cystoscopic examination, on November 23. If daily washings are found to be free from amœbæ until December 14, intestinal resection will be undertaken.]

**REPORT OF A CASE OF ACUTE PERFORATIVE, GANGRENOUS
APPENDICITIS.**

[Appendectomy on the U. S. S. *Virginia* at sea on the southern drill grounds.]

By Surg. J. B. DENNIS and Asst. Surg. A. C. STANLEY, U. S. Navy.

This case is of interest because of the marked rapidity of the gangrenous change in the appendix. On September 6, 1909, Corporal S., U. S. Marine Corps, reported at the sick bay complaining of pain in lower right quadrant of abdomen and of constipation. A dose of oil was given and patient returned to duty. On September 8, at 6.15 p. m., he again reported at sick bay complaining of pain in abdomen, and at this time examination elicited no localization of pain, which seemed to be general. Because of the fact that the man was a gun captain he was allowed to return to his gun and complete firing. Two hours later he was taken sick at his gun with violent seizures of pain and vomiting and was immediately brought to the sick bay and further examination made. Temperature, 99.2° F.; pulse, 96; abdomen slightly distended; pain confined to appendiceal region; slight rigidity of right rectus muscle, with exquisite tenderness over the appendix. A diagnosis of perforative appendicitis was made and immediate operation advised. At this time, temperature being 102.8° F., he was placed on the operating table at 11 p. m. and prepared in the usual manner; ether anaesthesia; an incision 4 inches long made over appendix at outer edge of right rectus muscle; the exposed peritoneum, being of a pearl-gray color and considerably thickened, was then incised and opening enlarged; 3 drams of pus sponged out of the cavity, the cæcum was found and appendix delivered as part of a large adherent mass; the appendix was walled off by sponges and freed from the small intestines and bleeding points ligated; appendix 3½ inches long and greatly inflamed and enlarged, while at the tip there were two gangrenous areas, in one of which there was a small

perforation which admitted a small-sized probe. The appendix was now clamped in two places one-quarter of an inch from the base and purse-string suture applied, meso-appendix ligated and freed from appendix, which was then removed by cutting between clamps; stump wiped 1:500 bichloride solution and buried in the cæcal wall by purse-string suture; over this two Lembert sutures were applied, rubber drainage tube inserted in lower end of wound, passing to depth of 3 inches, and wound closed in usual manner. Patient was given one-thirtieth grain strychnine before he left the table; pulse 118 and good quality; at 3 a. m. 6 ounces of normal salt solution given by rectum was retained. At 6 a. m. temperature 100, pulse 84, and condition satisfactory.

September 9: Patient somewhat restless; general condition good; catheterized at 1 p. m.; temperature, 101.2° F.; pulse, 92; 6 ounces normal salt solution given every four hours. Rectal tube used every other hour, with great relief; dressing changed, but slightly soiled, no odor; catheterized at 10 p. m.

September 10: Condition much improved; temperature, 100; pulse, 77; salt solution at 9 a. m. and 3 p. m. At 7 p. m., temperature, 100; pulse, 72; passes considerable gas; 9 p. m., dressings changed, only slightly soiled; catheterized at 12 p. m.

September 11: Wound dressed; slight discharge, no odor. At 6 p. m., temperature, 100; pulse, 72; the salt solution has had a remarkable effect in allaying thirst; catheterized.

September 12: Temperature normal; pulse, 72; condition good; saline solution given and wound dressed.

September 13, 6 a. m.: Temperature normal; at noon, 100; pulse, 88. As rise in temperature was believed to be due to an infected suture and stoppage of the drainage tube, the stitches were removed and drainage tube changed.

September 14: Condition somewhat improved; passes considerable gas; beef juice and water given; temperature, 100; wound dressed and 300 c. c. of urine voided.

September 15, 6 a. m.: Temperature, 100; 9 a. m., 100.4; at noon, 101.2° F.; dressing changed and new tube inserted; saline solution given during the day; dressing again changed at 7 p. m.

September 16, 6 a. m.: Temperature, 99° F.; at 4 p. m., 99° F; general condition very good; two soft boiled eggs given.

September 17: General condition good; temperature, 99; pulse, 76; wound dressed; slight discharge; temperature at 6 p. m., normal.

September 18: Temperature normal; soft toast added to diet; wound dressed; general condition excellent.

September 19: Temperature normal; wound redressed; condition good.

September 20: Temperature normal; wound dressed; condition good; drain removed and small gauze wick placed in wound to depth of rectus muscle.

After this date the patient's condition was satisfactory and progressively improved without complications; entire wound healed perfectly, resulting in a firm scar. He was discharged to duty October 11.

CASE OF VINCENT'S ANGINA.

[From the U. S. S. *New Jersey*.]

By Asst. Surg. L. C. WHITESIDE, U. S. Navy.

T. E. R., P. M., was admitted to the sick list on June 24, 1909, with diagnosis of tonsillitis. He had the usual signs and symptoms of follicular tonsillitis, with temperature of 101° F., pulse 88, respirations 24. Treatment, sodium salicylate and sodium bicarbonate, of each 20 grains every four hours, Dobell's gargle, t. i. d. On the night of the 25th his temperature was 103.4° F., pulse and respirations remaining the same as on the previous day. Examination revealed bilateral enlargement of the cervical glands. Throat examination revealed grayish-green patches on both tonsils, involving anterior pillars and extending to sides of uvula. There was marked edema of surrounding tissues.

From Osler's Practice of Medicine we read:

What has been described of late as Vincent's angina is an acute, febrile, pseudo-membranous inflammation, with soft, yellowish-green exudate, which on removal leaves a bleeding ulcer. The general symptoms may be severe, and there may be swelling of the glands of the neck. A *bacillus fusiformis* has been described in connection with it. There are instances in which the ulceration has been extensive, even proceeding to destruction of the uvula and of the soft palate.

Smears were taken from these patches and examined directly for *B. diphtheria*. The Neisser's stain proved negative; the methylene blue and Gram's stains showed large fusiform bacilli and numerous spirochætes. Few pneumococci were present. The fusiform bacilli and spirochætes were both positive to Gram's stain.

Referring to Stitt's Practical Bacteriology, Blood Work, and Animal Parasitology we find the following:

In diphtheria examinations we rely chiefly on the cultural findings on Löffler's serum. Where the process is streptococcal or due to the organisms associated with Vincent's angina, the immediate examination of a smear from the suspected spot or area gives greater diagnostic information. * * * It is believed that ulcerative conditions of the throat, associated with the presence of the large fusiform bacillus and delicate spirillum, which make the picture of Vincent's angina, are more common than is usually so considered.

On the 26th and 27th patient's temperature averaged 100° F., with evening rise of 2°. Marked prostration was present. Examination of the throat revealed slight extension of patches on uvula.

On the morning of the 28th smears were again taken and stained as before, with the same result. Temperature, 101° F. during this day. Prostration was not so marked.

The 29th found the patient much improved, his temperature dropping to 99° F. during the day; throat clearing up, edema subsiding, and patches disappearing. From this date until his discharge to duty on the 3d of July he ran a normal temperature and continued to improve, the throat clearing rapidly. Subsequent examinations of smears from his throat failed to reveal either the fusiform bacillus or the spirillum.

When questioned patient gave history of having had two previous attacks of the same nature several years ago. Venereal history was negative.

Owing to the limited amount of literature treating on Vincent's angina it would be difficult to state whether this was a primary or recurrent attack.

TWO CASES OF "OPHTHALMIA GONORRHOICA."

By Passed Asst. Surg. R. R. RICHARDSON, U. S. Navy.

No. 1.—H. McC., O. S. Admitted to hospital on August 10, as with "ophthalmia gonorrhoea." Both eyes were discharging pus in which the gonococci were demonstrated upon admission. Chemosis moderately severe. A continuous watch (day and night) was placed on the patient. Ice compresses (changed twice every five minutes) were kept continuously applied to the eyes. Eyes washed out every two hours with a 25 per cent solution of argyrol and when necessary with a saturated solution of boric acid. On August 18 all inflammation had subsided and treatment was discontinued. There was no further trouble and patient, having recovered from his accompanying gonorrhoea, was discharged to duty cured, on September 11, one month after admission to hospital.

No. 2.—H. R., B. M., first class. Admitted to hospital on September 9, as with "ophthalmia gonorrhoea." Both eyes were discharging pus freely in which the gonococci were demonstrated upon admission. Chemosis was very severe. A continuous watch (day and night) was placed on the patient. Ice compresses (changed twice every five minutes) were kept applied continuously to the eyes. Eyes washed out every two hours with a 25 per cent solution of argyrol and when necessary with a saturated solution of boric acid. On September 21 all inflammation had subsided and treatment was discontinued. Pa-

tient had developed a severe arthritis involving both elbows, knees, and ankles, to which treatment was then directed. On September 28 eyes were reinfected, gonococci again being found in the pus. They had remained perfectly clear, with no inflammation or discharge present since the 21st. Treatment was immediately instituted the same as at first. On October 7 all inflammation had again subsided and eyes were perfectly clear and normal in every respect. On September 25 a sore (chancre?) appeared on the foreskin. Patient stated that it had been just one month since he had had intercourse. On October 9, the eyes being normal and the gonorrhœal discharge from penis having ceased, patient was discharged with "ophthalmia gonorrhœica" and admitted as with "arthritis gonorrhœica," both shoulders, elbows, knees, and ankles being swollen, stiff, and painful. Sore on foreskin not yet healed.

CURRENT COMMENT.

[It is to be remembered that in the publications of these comments the bureau does not necessarily undertake to indorse the opinions expressed, but will lend the pages of this section to discussion of such contemporary topics as will be of interest and value to the service.]

VENEREAL PROPHYLAXIS.

The commander of the Third Squadron, United States Pacific Fleet, has, among other provisions for forwarding medical reports and returns, directed in squadron Special Order No. 14:

The senior medical officers of all vessels and the naval stations at Cavite and Olongapo and the legation at Peking will forward a monthly prophylactic report in the form supplied by the flagship.

As has already been shown in the annual report of the Surgeon-General of the Navy for 1909, the results of venereal prophylaxis as practiced on ships of this station continue most favorable and inspire the hope that in another year, by the marked reduction of venereal disease, they may justify congratulation from the service at large.

The successful solution of this problem in a squadron which includes ships with complements varying from 836 (*Charleston*) to 58 (*Villalobos*) should justify the opinion that similar methods should succeed in other divisions of the force afloat. Various methods are being tried on ships of the Atlantic and Pacific fleets, and the *BULLETIN* contemplates publishing, from time to time, special reports on the subject. It may well be anticipated that the method adopted upon a scout cruiser will not prove adaptable to the larger crew of a battle ship or to a small gunboat assigned to special duty. In this issue will be found a report from the medical officer of the *Salem*, indicating the means which he has thus far found successful. It is the bureau's hope, if not its conviction, that conditions of concealed disease therein depicted could have existed on few ships of the navy, and yet it indicates the direction which careful inquiry should pursue.

HEALTH RECORDS FOR THE NAVAL PERSONNEL.

In connection with the review of Oudard's article on "The cruiser *Alger* in the Far East," on page 103 of this issue, it is interesting to note what the Paris correspondent for the *Journal* of the

American Medical Association reports under date of September 10, 1909:

M. Henri Cheron, assistant secretary of the navy, has just decided on the issue of a medical record book for each man in the marine service, similar to one used in the army on land, in which will be entered the marine's height, weight, chest measurements, and acuteness of visual and auditory perception. This book will follow the man wherever he goes. The military medical officers will set down there the results of their examinations, the names of the diseases treated, admissions to hospital, convalescence, etc. This book will permit the medical officers, whose task is particularly difficult because of the incessant changes to which the marine service is subject, to watch over and to treat their patients more easily. Moreover, the examination of this record book will be particularly useful at the time of reenlistment or reengagement, in order to avoid taking on men who are unfit for service. The medical record book will be passed from physician to physician, under sealed cover, and the disease treated, when of a confidential nature, will be indicated only by number. The injuries or accidents which might entitle the man to a pension will be very exactly described in this record.

Various surgeons of our own service have, during the past five years, submitted suggestions looking to the development and adoption of a health record which should accompany officers and men and remain in the custody of the medical officer to whose ship or station they are assigned, but thus far no one or combination of these has been drawn up which will stand destructive criticism (usually in comparatively minor particulars) upon which experienced observers properly insist. If any change should prove practicable, the hope is invariably expressed that present forms shall be simplified and reduced in numbers, rather than that any increase in complexity shall result. All forms and suggestions hitherto submitted to the bureau have been carefully compared, combined, or rearranged, and there is some prospect that a satisfactory health record will be devised. The more radical and, at the same time, desirable suggestion would substitute this one form for the medical journal on ships or stations, case papers in hospitals, the body of the hospital tickets, and the health record as it is now contained in the enlistment record. Auxiliary changes would be the substitution of a card system for Form X and the abandonment of Form F-2 in favor of a quarterly Form F, to be arranged alphabetically. Further suggestions on this subject are invited. One of the chief mechanical difficulties has been the finding of a satisfactory and durable method for attaching new blank pages to such records as might require many or lengthy records in order to insure against loss by much manipulation or undue carelessness.

The problems upon which there seems to be the least uniformity of opinion, and which await satisfactory solution, are the method for return from the bureau of the summary of health record of former enlistment to be attached to the new form issued upon reenlistment,

and the determination of the intervals at which the case records of officers should be forwarded to the department. If a card system for Form X were established and a card forwarded to the record and pension division of the bureau for each enlistment, one of a distinguishable color might be adopted for reenlistments which would automatically call upon the bureau to furnish the summary from the former health record; it has been suggested that officers' records might be called for shortly before the contemplated examination for each promotion.

HYGIENE EXHIBITIONS.

Two very large and important hygiene exhibitions have been announced as being now in process of preparation, and to both of which the whole civilized world has been urged to contribute.

1. From the executive committee of the exhibition of hygiene of the International American Congress of Medicine and Hygiene, to be held in Buenos Aires in 1910, comes an invitation to participate. With funds, granted by the supreme Government of the Argentine Republic, the executive committee has set to work to make this exposition a success. The exhibition is to be located in one of the most beautiful and most frequented parts of the city of Buenos Aires, on the side of one of the most important thoroughfares, in Alvear avenue, and on a large enough plat of ground to give ample accommodations to all possible exhibits.

Among the subjects to be illustrated by the exhibition are: Sports, physical exercises, dwellings, habitations, dress, food, sanitation of cities, ventilation and heating, hospitals, naval and military hygiene, Red Cross. Foreign exhibits will be exempt from the customary import duties.

The executive committee has fixed the rate for exhibits as follows:

Inscription rate	\$20.00 (Paper)
Rent:	
Inside buildings, per square meter	15.00 (Paper)
Outside buildings (pavilions), per square meter	10.00 (Paper)
Special illumination to be paid for extra by the exhibitors.	

2. Perhaps the most comprehensive and, from both the scientific and practical standpoints considered, the most thoroughgoing and complete ever before planned is the one now in course of preparation, the Internationale Hygiene-Ausstellung, intended to be completed in 1911, in Dresden, Germany.

A large number of the most eminent men in hygiene of Germany have been at work ever since 1906 in planning this great exhibition. The beautiful and favorite city of Dresden, with its central location, with its legions of artists and trained workmen, experienced in exhibition work, would alone make this city a very fortunate selection.

The unanimous consent of the highest authorities in hygiene of Germany and other countries to cooperate, the high patronage of His Majesty the King of Saxony and the honorable præsidium by the chancellor of the Empire, would vouch for the unquestioned and unqualified success of the undertaking.

Perhaps in no other civilized country has scientific hygiene been further advanced, its practical advantages been more deeply recognized, than they have in Germany: in none, certainly, have its lessons been applied with greater thoroughness and brought nearer the home of individuals than in Germany. Both the Government and the people seem to be firmly united in trying to surround themselves with the practical advantages offered by scientific hygiene. From day to day the life of every German inhabitant seems to become more hygienic and, consequently, more enjoyable and in direct proportion as the lessons of hygiene are being converted into practical home life.

The provisional plan, published a few months since, divides the exhibition into 12 large groups, as follows:

- Group I: Air, light, soil, water.
- Group II: Dwellings, cities.
- Group III: Nutrition, articles of food.
- Group IV: Clothing, bodily care.
- Group V: Occupations.
- Group VI: Infectious diseases.
- Group VII: Care of sick, life-saving.
- Group VIII: Children, youths.
- Group IX: Traffic.
- Group X: Army and navy.
- Group XI: Tropical hygiene.
- Group XII: Statistics.

Special groups are planned for: Tuberculosis, alcoholism, venereal diseases, cancer, dental diseases, historical division.

This exhibition will be the grandest practical lesson in hygiene ever given to the public or the profession. (*Medical Inspector H. G. Beyer.*)

A FEW NOTES ON MALINGERING.

By Surg. F. M. FURLONG, U. S. Navy.

The subject of malingering is one which frequently confronts medical men, particularly those in the military services.

In civil life cases of malingering occur in suits for damages against individuals and corporations, from the avoidance of jury duties, to secure admission to hospitals for a comfortable home for a few weeks, to excite sympathy, to secure pensions, and from many other reasons.

In the naval service the usual motives are to get transferred out of a ship to a hospital, to secure discharge from the service, to avoid

disagreeable and irksome duties by getting on the sick list and as an excuse to escape punishment. Homesickness is also a cause. E. W. Dwight, of Harvard, in his work on Medical Jurisprudence, states: "There is no disease that has not been simulated and there are but few groups of symptoms that may not be feigned." Malingerers for the sake of carrying out their designs will not only pretend illness but will induce, protract, and magnify the importance of illness and injury. As in cases of real affections the symptoms are subjective and objective, and it is the former which probably cause the most difficulty in their detection.

Some of the alleged affections which have come to my notice or that I have heard of are deafness, conjunctivitis (induced by irritants), blindness, defective vision, color blindness, skin eruptions (produced by irritants), palpitation of the heart (caused by eating tobacco), pain in almost every part of the body, stomach and abdominal affections, vomiting, diarrhœa, insanity, bed wetting, epilepsy, joint affections, heat prostration, paralysis, appendicitis, drug habit, gonorrhœa (from an injection of canned cream), aphonia, sugar and albumin in the urine, tuberculosis (sputa said to have been obtained from a true case), etc. There are also a number of cases of self-maiming by means of firearms, knives, etc., on record.

In addition to the feigning of affections, some men seek to shirk work or get discharged on account of complaints, the importance of which they exaggerate. In this class may be mentioned varicose veins, varicocele, flat feet, slight joint and bone deformities, etc.; some use as excuses the fact that they have had operations for hernia, appendicitis, varicose veins, etc.; at the same time it must be borne in mind that there are really some true cases of the latter class.

Frequency.—In my experience, malingering is more common among recruits and newcomers to a ship and occurs more frequently in newly commissioned vessels. The longer a ship is in commission the less malingering will be found. Occasionally new drafts of men from training stations are received, even in old ships, and it is important to overhaul the recruits as soon as possible; my plan is also to secure an admission from each man that he is in good health and has no disabilities; later, when he alleges some illness or disability without good reasons, his attention is called to the fact that on such and such a date he stated he was in good health and had no previous troubles; this usually ends the matter.

Detection.—This may be easy or difficult, according to the individual and according to the affection and symptoms feigned. In clever and plausible men it may be impossible to detect them, but in any event it is a battle of wits between the malingerer and the medical officer. Minor cases can usually be disposed of by simply refusing to place the men on the sick list, though to detect the complaints of

persistent individuals, especially if they are under charges, will take all the ingenuity the medical officer can bring to bear. The latter is moreover handicapped by the fact that malingering is a difficult thing to prove, and, furthermore, if he makes a mistake and the man subsequently becomes ill or disabled, the surgeon must accept the responsibility.

Important cases should be subjected to a thorough physical examination, with the individual stripped. This includes everything possible within our means, vision, examination of urine, height, weight, etc. Should this examination disclose nothing positive the suspected individual should be placed on the sick list for observation for a few days. In this way a great deal may be learned, as the man is under the eye of the medical officer and the hospital corps. Without the assistance of the latter many a case would escape detection, and to them I am much indebted for the solution of some very difficult and annoying problems. Furthermore, hospital corps men can obtain information concerning individuals of the crew that officers could never ascertain. Some cases may require a long period of observation and frequent examinations under different conditions; in fact, everything possible should be done to run down a case. The following points must also be considered: The length of time in the service, as malingering usually occurs, but not necessarily so in recruits; the general reputation of the man under consideration, a very important guide, as malingering usually appears in shirkers rather than workers, and in the class known as "undesirables." The man's division officer, division petty officers, and masters at arms should be interviewed with a view to ascertaining any important information bearing on the case. An examination of the enlistment record for data concerning offenses and proficiency in rating will be an important feature bearing on the man's character. Examination of the ship's report book should not be overlooked, and if his name is found and the man's case is awaiting investigation by the commanding officer "at the mast," it is fair evidence that the man is a malingerer; this in the absence of any real cause.

Treatment.—If positive evidence can be obtained, the case should be reported, with a view to the man's trial by court-martial, and one conviction will do more to prevent imitators than anything I know of. Fortunately for us, some of the recognized methods of treatment in cases of the really ill are deterring agents in the cases of the fraudulent. Among these may be mentioned rest in bed, use of the bedpan, liquid diet, passing of the stomach tube for examination of stomach contents, and the prohibition of novels and newspapers. Other methods of treatment depend on the case; symptoms of pain and paralysis may succumb to hypodermics of water, the application of strong electric currents, and the thermocautery. The detection of

defective vision is sometimes brought about by bandaging of the eyes, with compulsory rest in bed, or by keeping the "patient" in the isolation ward with the battle ports closed. Nauseating mixtures are useful, and one of our surgeons tells me that the application of castor oil to the fauces is very successful. Bed wetters should be called frequently at night and, if necessary, this treatment should be supplemented by the use of ice-cold Sitz baths. I know of two cases of aphonia which were discovered by anæsthesia. Preparation for operation will often bring malingerers to light, though cases are known where actual operations have been performed.

The following is a brief review of a few pertinent incidents which have come under my observation:

A first-class petty officer in his second enlistment presented himself at sick call with a macular and papular eruption over his whole body. There were no other symptoms. The hospital steward investigated the case and discovered that the man wanted to get out of the ship and had sent ashore for croton oil, with which he had anointed himself. It is needless to state that he did not get to the hospital.

A first-class fireman who had a soft job was relieved from this duty and sent below to regular duty in the fireroom. Immediately he became "sick," alleging stomach trouble, loss of appetite, etc. Investigation showed that his appetite was enormous and that the stomach affection was feigned. He stated that since enlistment he had lost 30 pounds, whereas it was found that he had actually gained 10 pounds. He was tried and convicted by court-martial.

A coal passer who was under charges of absence without leave and refusing duty became "ill," alleging vomiting and diarrhea. He was kept under observation for two days, during which time he ate everything that was given him and was found not to have diarrhea. He was tried and convicted by court-martial.

A petty officer alleged appendicitis. A hospital corps man learned he had made boasts that he was going to be sent to the hospital before the ship sailed and that he had, moreover, previously inquired from another hospital apprentice the symptoms of appendicitis. He was placed on the Oschner plan of treatment for three days and on a liquid diet for another three days. On the second day, when preparations for an operation on him were being made, he then stated that he was cured. Notwithstanding which, he was kept four days longer. He recovered.

A private of marines alleged almost total deafness. His attitude was very suspicious. One day he was asked to blow his nose, and as he pulled a handkerchief out of his pocket a nurse dropped a half dollar on the deck. This the man immediately stooped to get. The incident was closed.

A coal passer alleged headache and vomiting. On his arrival in the sick bay no evidence of illness was found. Investigation disclosed the fact that before coming to the sick bay he had stated to two other men that he was tired of working and was going "to pull the sick list." These men testified against him at a trial by court-martial and he was convicted.

An ordinary seaman alleged pain and stiffness in one of his kneejoints, which treatment did not seem to modify. His manner was insincere, so he was prepared for operation just the same as a true surgical case. He held out until he was placed on the operating table, when he announced that the trouble had almost disappeared.

The subject of malingering is a very important one and everything possible should be done to prevent it. Medical Inspector J. D. Gatewood, U. S. Navy, in his recent work on Naval Hygiene, shows how men accepted with flat feet, varicocele, varicose veins, scars of operations from appendicitis, hernia, etc., which do not give them trouble prior to enlistment may cause considerable trouble after enlistment when the change of life and the glamor of a naval career have worn off. Therefore medical officers at recruiting stations should be very careful as to accepting men with any conditions that subsequently can be used as excuses to get on the sick list. Another point is that when a man comes in at sick call and alleges some disability such as defective vision, stating that he wore glasses before entering the service, there are no means at hand to combat his statement, so therefore if recruits were made to sign a statement containing a number of questions about their former history we would have something tangible to go on, and I venture to predict that many annoying cases which now occur would never arise.

PERFECTED ROUTINE OF DOSAGE, ETC., IN THE TREATMENT OF TUBERCULOSIS BY THE ADMINISTRATION OF MERCURY.

As prescribed by Surg. B. L. WRIGHT, U. S. Navy, United States naval hospital, Las Animas, Colo.

The following leaflet has been issued for the further information of those already interested in this treatment:

It is believed that mercury acts in two ways: First, as a tonic, increasing the vitality of the cellular elements of the various organs and tissues; and, second, that it renders the blood bacteriacidal, producing an antitoxin therein, which has a direct destructive action upon the tubercle bacillus.

This action of mercury is cumulative and lasting, and the immunity conferred by the early doses, plus the resistance to the disease developed by the increased cellular vitality, places the patient in such condition that, as treatment is continued, smaller doses are required to obtain the desired results.

If the patient continues to receive the same dose of mercury upon which he was first placed and began to improve, there will sooner or later be noticed: First, a rise in temperature; second, a loss of weight; and should these signs be passed unnoticed it is probable that more or less serious damage would result; possibly an active general cellular degeneration, including the cellular elements of the blood would occur, resulting in more or less permanent damage to the patient, if not a rapid decline and death.

It is only by close observation of each individual patient that the original and succeeding dosage can be determined. Never push the drug to the point of salivation.

Experience with this method of treatment has shown that the maximum dosage for the original series of injections can not be carried beyond thirty injections without producing the conditions mentioned above, and that after a period of rest, upon resuming the injections, that the dose carried through the second series of injections must be reduced.

Since February, 1908, the treatment advocated has been by deep muscular injections of mercury. Experience has led us to modify in some degree the dosage first used and recommended. The first modification led toward larger doses, which for a short time produced much more rapid improvement, but which, when continued over any length of time, produced unfavorable results, and if persisted in would have probably resulted disastrously for the patients. This being promptly appreciated, the dose was reduced, and for the last six months the following routine has been carried out:

Begin with one-fifteenth grain of mercuric succinimide; give injections every other day; slowly increase the dose until a slight tenderness of the gums or a slight diarrhea is produced, then reduce the dose until these symptoms are overcome, and continue the injections until thirty have been given.

Then rest for two weeks; at the end of this interval of rest resume injections, using the dose used at the last previous injection and continue upon this dose as long as the patient continues to improve up to 30 injections; if any untoward symptoms arise or the patient does not appear to be doing well, reduce the dose, or alternate injections of mercury with injections of arsenious trioxide, one-thirtieth grain, and ferrous citrate, one-half grain, recommended by Harris, of Providence, R. I., for a short time.

Each series of injections to consist of thirty, with two weeks of rest intervening. As treatment progresses smaller doses of mercury are required. At the end of one year's treatment a rest of from two to three months should be given, when, if the patient is not cured, treatment should be resumed.

As many cases of syphilis do not respond entirely to mercury, but do better when this drug is combined with arsenic, so many cases of tuberculosis do better when arsenic is added to the doses of mercury.

The above treatment, when properly carried out, first produces a fall in temperature, cessation of night sweats, increase in appetite, slowing of the pulse, gain in weight, a better feeling and a rapid decrease in the physical signs; also a decrease in cough, and a more or less rapid decrease in the number of tubercle bacilli.

When the dose is too large, in addition to the symptoms of mercurialization, any one or all of the following may be observed: Rise in temperature, loss of weight, gastric disturbances, excessive increase in cough and expectoration, angina, or an ulcerative stomatitis. Any of the above symptoms being present calls for a reduced dose.

The initial injection, if the dose be one-fifth grain of mercuric succinimide or one-eighth grain of the bichloride, is almost invariably followed by a rise of from $\frac{1}{2}^{\circ}$ to $1\frac{1}{2}^{\circ}$ of temperature within three to five hours. It has often seemed that this feature may be of diagnostic value.

PROGRESS IN MEDICAL SCIENCES.

LABORATORY.

Passed Asst. Surg. O. J. MINK and Asst. Surg. E. W. BROWN, U. S. Navy.

A NEW METHOD FOR THE CLINICAL ESTIMATION OF TOTAL NITROGEN IN URINE, FECES, OR OTHER ORGANIC MATERIALS.

From the standpoint of the chemist, the Kjeldahl method for total nitrogen is very satisfactory and highly accurate; from the clinical standpoint it requires time and apparatus not at the disposal of the medical officer of the service. This is unfortunate, as few methods are more broadly applicable in both medicine and hygiene if full laboratory facilities are at hand. The object of this paper is to describe a new modification of the Kjeldahl process which appears to overcome these objections, so that good results may be obtained under clinical conditions; but before describing this short method the importance of the subject as related to clinical diagnosis would be urged.

The total nitrogen of the urine is the best index we have of proteid metabolism and, therefore, is of great significance in pathological disturbances of nutrition. It is often of importance to know the quantity of proteid a patient consumes daily; weighing the food may be impracticable, but the total nitrogen of the urine will give a rough determination. The ratio of the total nitrogen to certain other nitrogenous bodies of the urine is often important, conspicuously so in relation to the ammonia nitrogen, i. e., the so-called "ammonia quotient" in conditions of acidosis, as pointed out in a previous paper in the *BULLETIN*. Thus in a case of advanced diabetes the information afforded by this ratio would be of much greater value as an indication of acid intoxication with danger of coma than merely the ammonia output alone, for the latter also increases within certain limits in health with increase of proteid food.

Again, 85 to 90 per cent of the total nitrogen is normally represented by urea which in many respects, has the same clinical significance as the total nitrogen. The hypobromite method for urea, the one still commonly used in clinical laboratories, is not permissible on board ship and fails in accuracy even from a clinical view point in certain conditions where most needed, notably when the urine con-

A CLINICAL MODIFICATION OF THE FOLIN-SCHAFFER METHOD FOR THE
ESTIMATION OF URIC ACID IN THE URINE.

The clinical estimation of uric acid has assumed increased importance during the past few years, owing to the great advances in the chemical pathology of the subject. Important facts of direct clinical interest have been established regarding its relation to diet and tissue metabolism, and the purpose of this paper is to present a simple method of analysis which may encourage a wider study of its clinical relations. The Folin-Schaffer method is accepted as the most accurate, but the time consumed is a serious objection for clinical purposes. Of the few short methods in vogue, the process recently devised by Kowarsky appeared to the writers as the only one promising reliable results. It is frequently referred to in recent German papers on uric acid metabolism. The directions are as follows: 10 c. c. of urine are pipetted into a centrifuge tube of 15 c. c. capacity; 3 grams of ammonium chloride and two or three drops of ammonia are added. The mixture is well stirred, allowed to stand two hours, and centrifuged. The supernatant fluid is poured off, 5 drops of concentrated HCl added to the sediment, and the mixture carefully heated over a free flame. The tube must now be left to stand for an hour for the complete separation of free uric acid. About 2 c. c. of water are added and the centrifuge used again. The overlying fluid is poured off and the sediment whirled with several successive portions of alcohol until all mineral acid is removed. It is now heated almost to boiling with a few cubic centimeters of water and titrated with an $\frac{N}{60}$ solution of piperidine. In our hands this method gave very unsatisfactory results. With many samples it was impossible, even at the beginning, to obtain a complete sedimentation, even after prolonged whirling. The many successive manipulations necessary as preliminary to the titration present the serious difficulty of loss of precipitate; and such an error is enormously multiplied in computing the twenty-four-hour quantity, owing to the small volume of urine taken. The method was therefore finally abandoned in favor of the plan about to be described, which overcomes these disadvantages and is now included in the course in clinical chemistry at the United States Naval Medical School. The principle is that of the Folin-Schaffer process.

Technique of the clinical method—

Solution (1) Ammonium sulphate.....	grams.....	500
Uranium acetate.....	do.....	5
Acetic acid 10 per cent.....	cubic centimeters.....	60
Water.....	do.....	650

(2) $\frac{N}{50}$ KMnO_4 1 c. c. = 1.50 mgs. uric acid.

10 c. c. of filtered urine are placed in an ordinary centrifuge tube and exactly $2\frac{1}{2}$ c. c. of solution (1) added. The mixture is centrifuged for about five minutes and the clear supernatant fluid decanted; 10 c. c. are pipetted into another centrifuge tube, 1 c. c. of concentrated ammonia added, and the mixture set aside until the following morning. The overlying fluid is now passed through a small hardened filter, no attempt being made to transfer the crystals of ammonium urate. These are washed with three successive portions of 10 per cent ammonium sulphate of 3 to 5 cubic centimeters each. The crystals are well stirred, allowed to settle, and fluid poured on the same filter. The residue on the filter may be transferred to the centrifuge tube with about 5 c. c. of hot water. 1 c. c. of concentrated sulphuric acid added, and titrated at once, hot, with $\frac{N}{50}$ KMnO_4 . It is more convenient, however, to wash the urate on the filter with a 25 c. c. beaker with as small a quantity as possible of hot water. A few c. c. of hot water are placed in the centrifuge tube and 1 c. c. of concentrated sulphuric acid added. This is quantitatively transferred to the small beaker, the total volume of washings not exceeding 15 c. c. and the titration performed at once. The titration reading corresponds to 8 c. c. of urine and the titre of the permanganate solution is 1.50 mgs. per c. c. The calculations are made accordingly. An extensive experience with the complete Folin-Schaffer method has shown that the first filtration is very tedious, usually requiring two hours, or even longer, with the danger of separation of uric acid during this procedure. This feature is entirely done away with in the short method, and less apparatus is required. For comparison, the results by the two methods are tabulated at the end of the paper. For clinical purposes, the variations are slight. The usefulness of the centrifuge method when large numbers of routine analyses are to be made is amply shown.

The long standing to separate the ammonium urate is a drawback, and a number of analyses were made by the centrifuge method at varying shorter intervals to see if the error would be considerable. The following are some of the data recorded: Sample 1 gave 0.4239 gms. after standing overnight, 0.2073 gms. after four hours; sample 2 yielded 0.1006 gms. more when standing overnight than after three hours; sample 5 gave 0.4729 after full period, 0.3321 gms. after five hours. These and numerous other results demonstrate that even in the clinical sense the time for separation may not be shortened.

Estimations of uric acid.

Urine, twenty-four hours.	Short centri- fuge method.	Complete Folin-Schaffer method.
	<i>Grams.</i>	<i>Grams.</i>
Sample No. 1.....	0.4239	0.4630
Sample No. 2.....	0.6641	0.6453
Sample No. 3.....	0.5560	0.5836
Sample No. 4.....	0.7422	0.7531
Sample No. 5.....	0.4729	0.4528
Sample No. 6.....	0.3522	0.3311
Sample No. 7.....	0.9962	0.9608
Sample No. 8.....	0.5936	0.5900
Sample No. 9.....	0.6440	0.6339
Sample No. 10.....	0.3421	0.3721

(O. J. M. AND E. W. B.)

REVIEWS OF NEW METHODS IN CLINICAL CHEMISTRY.

WALKER, C. **A simple method of estimating the amount of sugar in diabetic urine.** *Lancet*, Mar. 6, 1909.

The author lays great stress on the advantage that his method requires no burette. The urine is carefully added, drop by drop, from a pipette to the Fehling's solution, boiling vigorously after each addition. This is continued until the bluish-red precipitate of cuprous oxide appears and the blue solution is colorless. The quantity of sugar is calculated from the number of drops necessary for the reduction. Urines containing no more than 1.25 per cent of sugar give an orange-red precipitate. If this does not become an intensely bright red on putting in additional drops, the urine contains no more than 1.25 per cent of sugar. The excess of drops is naturally not considered. It is claimed that the error incident to measuring by drops is properly corrected for in a table which gives the percentage of sugar directly.—(E. W. B.)

KWILECKI. **A modification of the Esbach method for estimation of albumin in the urine.** *Munich, Med. Woch. Bd.* 56, H. 26, June, 1909.

It is claimed that a complete determination can be made in two minutes in urines not exceeding 2 per cent albumin content; with higher percentages in six minutes. The Esbach tube is filled to the mark "U" with the urine, which must be of acid reaction; 10 drops of a 10 per cent FeCl_3 solution are now added, well mixed, and enough of the ordinary Esbach reagent added up to the mark "R." The tube is tightly stoppered and carefully shaken. The apparatus is then placed in an especially constructed water bath at a temperature

of 72° C. The albumin begins to settle rapidly and the percentage can be read off in the number of minutes mentioned above. The standard Esbach process requires twenty-four hours.—(E. W. B.)

WALBUM, L. E. A new albuminometer. Deut. Med. Woch. Bd. 34, 1728, 1908.

This apparatus is of unusual interest, as it aims to furnish a simple process for the rapid estimation of protein, not only in urine, but other animal fluids, as spinal fluid, blood serum, etc. This is of special interest in connection with the newly recognized value of such examinations in the differential diagnosis of nervous diseases. The turbidity produced in the protein solution by trichloroacetic acid is compared to the turbidity of bluish color in human serum of exactly known protein solution. The unknown protein solution is treated with trichloroacetic acid in a calibrated cylinder until it agrees in turbidity with the standard; the calibration is made to read directly in 0.1 per cent protein.—(E. W. B.)

ZEEHANDELAAR, HZ. A new simple method of sugar estimation in the urine by the glucosometer. Berl. Klin. Woch. Bd. 46, 113 January, 1909.

This ingenious method depends on the principle that glucose produces a red coloration in boiling with caustic potash. The urine is cleared by precipitating with subacetate of lead, treated with a definite quantity of 10 per cent potassium hydroxide, and boiled for a short time. The intensity of color produced is compared with a scale of tinted papers which corresponds to a series of percentages of sugar content in the urine, worked out empirically, somewhat suggestive of Tallquist's scale for hæmoglobin estimation. The operation is recommended as very simple and yielding sufficiently accurate results in a few minutes. The greatest variation from control, quantitative, estimations by the polarimeter was only 0.3 per cent.—(E. W. B.)

WILSON, G. H. On the application of the deviation of complement test in the detection of albuminous substances in the urine. Jour. of Path. & Bact., 1909, Bd. 13, p. 484.

A number of albuminous urines from nephritic patients were examined by this test. The method appears to be suitable for testing such urines and demonstrates the occurrence of a human antigen present in albumin and globulin. Normal urine contains no antigen. By boiling albuminous urines the deviation of the complement reaction is prevented.—(E. W. B.)

preparations, expressed in heart-tonic units per cubic centimeter, together with the date of manufacture, appear on the label. Regarding the loss of potency of the digitalis preparations, they agree that this either may be due to the menstruum not being sufficiently fermenticidal, or may be caused by various soluble constituents in the glass or bottles in which the preparations are kept. The menstrua (U. S. P., eighth revision) of the fluid extracts of digitalis and squills do not completely exhaust these drugs, the authors are therefore as yet not prepared to propose standards for these, although they show standards adopted by them for the 1890 preparations. In their work they have found that the average yearly loss of potency of the digitalis fluid extract is 4 per cent when prepared in accordance with U. S. P., seventh revision, while the eighth-revision preparation shows a yearly loss of 10 per cent.—(c. s.)

WILLCOX, W. H. The estimation and quantitative significance of hydrochloric acid in the gastric contents. *Quart. Jour. Med.*, vol. 3, no. 9, Oct., 1909.

The author considers that the true estimate of the quantity of hydrochloric acid secreted by the stomach can only be obtained by determining the total quantity of the acid present; that is, estimating not only that which is present in the free state but also that which is in combination with protein and organic bases, for all of this must have been secreted as acid in order to be present in the forms described, and therefore constitutes the active acid. Also that, owing to the many instances in which there is a large quantity of total, with but little or no free hydrochloric acid and because in many cases there is an excessive total acidity with but little or no hydrochloric acid of any kind, the estimation of the total hydrochloric acid is of the greatest importance for diagnostic purposes. After reviewing the various methods for making this estimation he recommends a modification of the Volhard-Luttke for the purpose.

In support of his contentions he gives tables of analyses which show that the quantity of total hydrochloric acid found in the various pathologic conditions were more in accord with the general teachings upon the subject than was the quantity of the free.

He also gives those conditions in which there is an increase of the acid and those in which a decrease usually occurs.—*Pharmacist E. R. Noyes.*

BAIN, W. M. D. The action of digestive ferments upon each other. *Proc. Royal Soc. Med.*, June, 1909, vol. II, no. 8.

From a series of experiments Bain found that the pancreatic enzymes and also papain and holadin were destroyed or their activity reduced by an acid solution of pepsin acting at a temperature of

36° C. Tryptic action was destroyed in two hours and seriously impaired by shorter contact; amylolytic action was completely destroyed within an hour; lipolytic action though not destroyed was much reduced within an hour. He also found that trypsin in alkaline solution destroyed both pepsin and papain. Also that papain destroys pepsin.

His conclusion is that in order to minimize the injurious influence of the gastric juice upon them the pancreatic preparations, when it is desired to give them to promote the intestinal digestion of protein and starch, should be given from half an hour to an hour after a meal, for then the stomach is rapidly emptying its contents into the duodenum, and consequently the pancreatic ferments will remain for the least time in contact with the gastric juice.—*Pharmacist E. R. Noyes.*

PATHOLOGY AND BACTERIOLOGY.

Passed Asst. Surgs. O. J. MINK and F. M. SHOOK, U. S. Navy.

CASTELLANI. Antityphoid vaccinations with attenuated live cultures. *The Lancet*, August 21, 1909.

The author mentions the results obtained in other diseases, as plague and cholera, by vaccination with live cultures. The broth culture of a nonvirulent strain of typhoid is grown for forty-eight hours and then heated to 50° for one hour. That the organisms are not killed is proven by culture.

He concludes from his work:

1. The live cultures produce a higher degree of immunization and are not dangerous.
2. Mixed vaccines may be prepared by using dead or live attenuated cultures of typhoid and dysentery or typhoid, paratyphoid, and dysentery. The inoculation of mixed vaccines may be of advantage in some cases, but the subject requires further investigation as regards its efficiency in man.—(O. J. M.)

FOWLER. Outbreak of food poisoning after a Christmas dinner. *Journal Royal Army Medical Corps*, September, 1909.

This outbreak appears to have been due to the meat of geese which was infected with *Bacillus paratyphosus*. The organism was isolated from the flesh of the geese and from the organs of the patients. It was agglutinated by the patients' sera in a dilution of 1 to 100.—(O. J. M.)

ROSS, G. W., and JONES, ERNEST. On the use of certain new chemical tests in the diagnosis of general paralysis and tabes. British Medical Journal, No. 2523.

The authors mention the importance of the high globulin content of the spinal fluid in the diagnosis of these cases. They carefully pour 1 c. c. of spinal fluid on 2 c. c. of saturated ammonium sulphate solution. A white ring at the junction of the two liquids indicates the high globulin content. In 27 cases tested the results paralleled those given by the Naguchi butyric acid test for precipitating the protein.—(O. J. M.)

HAMBLE, R. N. The occurrence of acetonuria following ether anæsthesia. Univ. Pennsylvania Med. Bulletin, No. 22.

Nineteen cases out of 60 (or 31.6 per cent) showed acetonuria after and not before operation, indicating that ether anæsthesia is the actual cause of acetonuria in about one-third of all cases.—(O. J. M.)

EYRE, J. W. H., and STEWART, B. H. The treatment of gonococcus infections by vaccines. The Lancet, July 10, 1909.

A. Acute gonorrhœa.

1. Gonococcus vaccine is markedly toxic and exerts a profound influence over the disease.

2. For routine work (hospital out-patients, etc.) vaccine treatment is not devoid of danger and requires the exercise of considerable caution.

3. A stock vaccine, comprising a dozen different strains, gives results only slightly inferior to those observed when using a vaccine prepared from the patient's own organism. This is not the rule in most other diseases.

4. Small doses, repeated at short intervals, are more effective than large doses at lengthened intervals.

5. Small doses of vaccine (from 1,000,000 to 10,000,000) are safer and more satisfactory than the large doses (50,000,000 to 100,000,000) which are often prescribed.

6. After an injection of 500,000 to 2,000,000 the negative phase is either absent or extremely transient.

7. An inoculation of from 5,000,000 to 10,000,000 causes a negative phase of usually not longer than forty-eight hours' duration, followed by a positive phase of from three to five days.

8. Vaccines in *small* doses serve the double purpose of *raising and steadying* the opsonic index. A steady index just above normal is found to be the most favorable condition for rapid recovery.

B. Simple chronic gonorrhœa.

1. Where the gonococcus has ceased to be the infecting organism these cases are on a par with other acute inflammatory states, but are frequently more difficult to cure owing to environment and local conditions.

2. Chronic cases where the gonococcus is the sole infecting organism have a better prognosis from the point of view of treatment by vaccine than a mixed infection or one of staphylococcus only.

C. Chronic gonorrhœa with complications.

1. The estimation of the opsonic index is helpful to diagnosis and is a useful means of determining *approximately* the opsonic state of the blood. Chronic gonococcus infections, however, present clinical features which themselves afford valuable indications during the course of vaccine treatment.

2. Where the gonococcus alone is the infecting organism, if the opsonic index can not be obtained as frequently as is desirable, routine injections of from 1,000,000 to 2,000,000 every three to five days are safe and satisfactory; a lapse of five to seven days after doses of 5,000,000, and interval of eight to ten days after an inoculation of 10,000,000. Larger doses than these are seldom desirable.

3. Treatment by small and gradually increasing doses at frequent intervals should at all times be observed; the use of large doses is even more dangerous than in acute cases, and may be followed by disastrous consequences.

4. In orchitis small doses of vaccine quickly relieve pain and cause a more rapid abatement of symptoms than obtains by the usual routine treatment alone.

5. In iritis the severe pain, which is a marked and obstinate feature, is relieved in forty-eight hours after an injection, and disappears in from three to four days; cure is much hastened.

6. In arthritis the treatment is of considerable value.—(O. J. M.)

LIEFMAN. Concerning the mechanism of the sero-reaction of syphilis. Centralblatt für Bakt., Parasit. und Inf. Krank., October 14, 1909.

The author does not consider this a true binding of complement and considers the physical and chemical factors concerned in the reaction.

1. The organ extracts are replaceable by sodium taurocholate and glycocholate, soap, lecithin, and other lipoids. Watery extracts of normal liver contain some bile-acid salts, lecithin, and soap. In leucic liver the soap is increased, which would increase the soluble

fat in the watery extract. Therefore in syphilitic liver there **are** three substances which make the Wassermann reaction possible, **two** of which are increased over the normal.

2. How do these substances act on luetic serum? Gross and others have shown that the substance which causes the absorption of **complement** is a globulin, the most easily precipitated protein. **The** globulin of luetic sera is especially easily precipitated. **Precipitates** of different kinds can bind complement.

Sodium glycocholate and taurocholate with lecithin and soap can cause precipitation. Although in the quantities used no perceptible precipitate is caused, even this amount can bind complement.

Of more importance for the occurrence of the Wassermann reaction is the sheep-blood amboceptor, which is present in almost all human blood, and which causes the hæmolysis. This belongs to the globulin fraction, which is so easily precipitated in luetic serum. It is **also** easily inactivated by precipitation, which destroys or diminishes the hæmolytic action.

The precipitation with above substance presupposes a faintly acid reaction. This is present with luetic serum. Sachs has shown that an alkaline reaction hinders the Wassermann test, and acid reaction favors it. Alcoholic extracts favor it because they are rich in lipoids and alcohol, while watery extracts decrease the reaction because they are poor in soap and lipoids and thus their precipitating power is weakened.

3. The complement is bound by the luetic amboceptor and is carried down by the precipitate, while with normal sera the precipitation does not occur and the complement is not carried down, but remains active.

Discussion.—Landsteiner (Wien) : We can no longer believe that the Wassermann reaction is an antigen-antibody linking. A better explanation is that the complement is bound by the precipitate of colloids or is bound by the colloids even though the latter are not perceptibly precipitated. The active constituent of the extract has been shown to be lipoids, and the active constituent of luetic serum is precipitated with the globulin by CO₂ or ammonium sulphate. The reaction appears, therefore, to be a union between the lipoids of the extract and the proteid of the serum.

A more difficult question is the cause of the change in the luetic serum. The claim of Well that it is an auto-immunisation by the absorbed constituents of the body cells can not be supported because the serum changes can not be produced by injecting luetic organ extracts, and, moreover, many normal animal sera give the reaction. Luetic serum contains an increase of those proteids which have a strong binding power for certain colloids.

As the Wassermann reaction is given by normal extract, which certainly contained no treponemata, the reaction can not be considered to have anything specific to do with luetic material.

Wassermann (Berlin) believes that besides the lipoids another specific component is concerned in the reaction.

Uhlenhute (Gross-Lichterfeld) suggested the use of anaphylaxis to determine whether the alcoholic extracts contain, besides lipoids, traces of proteid, which may influence the reaction. He calls attention to the fact that complement binding does not always occur with precipitation.—(O. J. M.)

BREM. Investigation of blood for tubercle bacilli. Jour. Am. Med. Assn., Vol. 53, No. 12.

Brem reports the finding of an acid-fast bacillus in the distilled water furnished by the Isthmian Canal Commission, and gives his experience with the technic of Rosenberger. He summarizes as follows:

1. In examining blood, urine, stools, sputum, and exudates for tubercle bacilli, the greatest care should be used to exclude contamination of water and all solutions used with members of the acid-resisting group of bacilli (whether dead or alive).
 2. In this investigation coincidences occurred which were all but convincing of the presence of tubercle bacilli in the blood in every case of tuberculosis.
 3. Animal experimentation was negative, but the quantity of blood used for inoculation was too small for the results to be of great value.
 4. Acid-alcohol-resisting organisms were found eventually in fresh distilled water furnished by the Isthmian Canal Commission, in tap water, in old distilled water made with care in the pathologic laboratory, and in all solutions made up with the canal commission water. These bacilli were either dead or nonpathogenic to guinea pigs.
 5. There is as yet no conclusive proof of the frequent, continued presence of tubercle bacilli in the circulating blood.—(O. J. M.)
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SLATMEANU and OPOLU, DANIEL. On subcutaneous and ophthalmal tuberculin reaction in lepers. Compt. Rend. Hebd. de la Soc. de Biol., 1908, No. 34.

Thirteen lepers of the 29 injected with 3 milligrams of tuberculin each showed a more or less marked febrile reaction. Of the others, who were considered negative, a number suffered from vomiting, headache, and a falling temperature.

Of 24 lepers, 15 showed a positive conjunctival reaction, many of these being in the same cases which showed a positive tuberculin injection test. The author believes these results are due to the coexistence of tuberculosis and considers this disease to be a frequent complication of leprosy.

The same authors found that complement fixation, using leprosy serum and tuberculin as antigen, occurred only in cases complicated by tuberculosis.

Brinkerhoff, in a bulletin of the United States Public Health and Marine-Hospital Service, states that a certain per cent of lepers gave a positive reaction to the Moro's cutaneous tuberculin test. He believes this to be due to a group reaction.—(O. J. M.)

BASSETT-SMITH, P. W., fleet surgeon, royal navy. **The diagnosis of syphilis by some laboratory methods.** Paper read in the navy, army, and ambulance section, British Medical Association, Dublin, July 29, 1909. *Lancet*, August 21, 1909.

The writer had not found the microscopical demonstration of the *treponema pallidum* to be of much practical use, on account of the labor involved, although when found he considered it diagnostic of syphilis. By Wassermann's serum test, however, he found that almost all cases with evident primary syphilis gave a marked reaction, using for an antigen dried congenital syphilitic liver. The reaction was obtained as early as the fourteenth day after infection; in many cases admitted for chancroids, the presence of a mixed infection was early indicated by the test; in almost all cases of early secondary syphilis, with or without symptoms at the time, positive results were obtained; in late secondary stages or tertiary manifestations, the results were more variable; in almost 50 per cent of the parasyphilitic cases a positive reaction was present. Mercurial treatment did not appear to prevent the reaction when symptoms were present.—*Surgeon F. L. Pleadwell.*

BASHFORD, E. F., M. D., Edin. **Cancer in man and animals.** *Lancet*, September 4, 1909.

The author reviews the work of the Imperial Cancer Research Fund, London. He makes the following deductions:

1. All races of mankind and all vertebrates are subject to carcinoma while living under natural environment.
 2. Experimental reproductions of carcinoma and sarcoma may be accomplished in laboratory now at will.
 3. Senescence in man and animals is associated with inception of carcinoma.
 4. When cancer develops in young people growth is more rapid than in old.
 5. Apparent increase in deaths from cancer is due to the greater reliability of vital statistics.
 6. In savage races and nondomesticated animals, apparent infrequency of cancer is due to the fact that senescence is rare.
 7. Sites of cancer in male are stomach, 22 per cent; liver and gall bladder, 13 per cent; rectum, 10 per cent; intestines, 8 per cent. Females, 40 per cent of cases are of generative or mammary organs.
 8. Incidence of cancer on surface of the body in all races of mankind is associated with exposure to irritants.
 9. Tumor cells are not embryonic cells, but specially differentiated cells.
 10. Animal experiments show that cancer is not communicable by contact.
- (F. M. S.)

Relation of the spirochæta pallida to general paralysis. Editorial. *Jour. Am. Med. Assn.*, September 25, 1909.

New evidence that diseases such as tabes dorsalis and general paralysis are due to syphilis is presented by the fact that in these

conditions chemical changes in the blood serum are presented in the Wassermann reaction identical to those of syphilis.—(F. M. S.)

DAVIS, DAVID J., M. D., Chicago. **Influenzal meningitis.** Archives of Internal Medicine. Vol. 4, No. 4, p. 323.

Post-mortem examination of one case showed well-defined greenish-yellow areas of friable, purulent exudate, irregular in size, over entire convex surface of brain. The base of brain was also covered with similar exudate. Ventricles were not dilated and fluid was clear. In the spinal canal a large amount of turbid purulent exudate occurred about the cord. Nasal sinuses and tympanic cavities were negative. Bacteriological examination showed gram-negative polar-staining bacilli within the polynuclear cells. Cultures were identified as bacillus influenzae.—(F. M. S.)

JOHNSTON & CANNING. **Hæmolysis in the diagnosis of malignant neoplasms.** Jour. Am. Med. Assn., Vol. LIII, No. 18, p. 1479.

The authors after experimenting with the hæmolytic reaction in malignant diseases, conclude as follows:

1. The hæmolysis reaction appears to be of decided value in the diagnosis of malignant neoplasms. Negative results do not rule out malignancy, but speak strongly against it.
 2. The reversed hæmolysis appears to offer valuable information with regard to the extent and activity of the tuberculous lesion.
 3. Several examinations should be made in doubtful cases.
 4. The reaction does not appear to occur in other conditions that would lessen its value in the diagnosis of malignancy.—(F. M. S.)
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RECIO, Dr. ALBERTO, Habana, Cuba. **The Wassermann reaction in leprosy.** Sanidad y Beneficiencia, September, 1909. Vol. II, No. 2, p. 285.

Out of 14 lepers with cutaneous manifestations 13 gave a positive reaction. In 4 cases of tropho-neurotic leprosy there was 1 positive reaction, 1 doubtful, and 2 negative. The technique used follows that of Bordet and Gengou in the study of antigens.—(F. M. S.)

MEDICAL ZOOLOGY.

By Surg. R. C. HOLCOMB and Asst. Surg. P. E. GARRISON, U. S. Navy.

GARRISON, PHILIP E., and LEYNES RICARDO. **The development of the Miracidium of paragonimus under various physical conditions.** Philippine Journal of Science, June, 1909, p. 177.

These authors report an interesting series of experiments with the ova of *Paragonimus*, the purpose in view being to determine, first, the

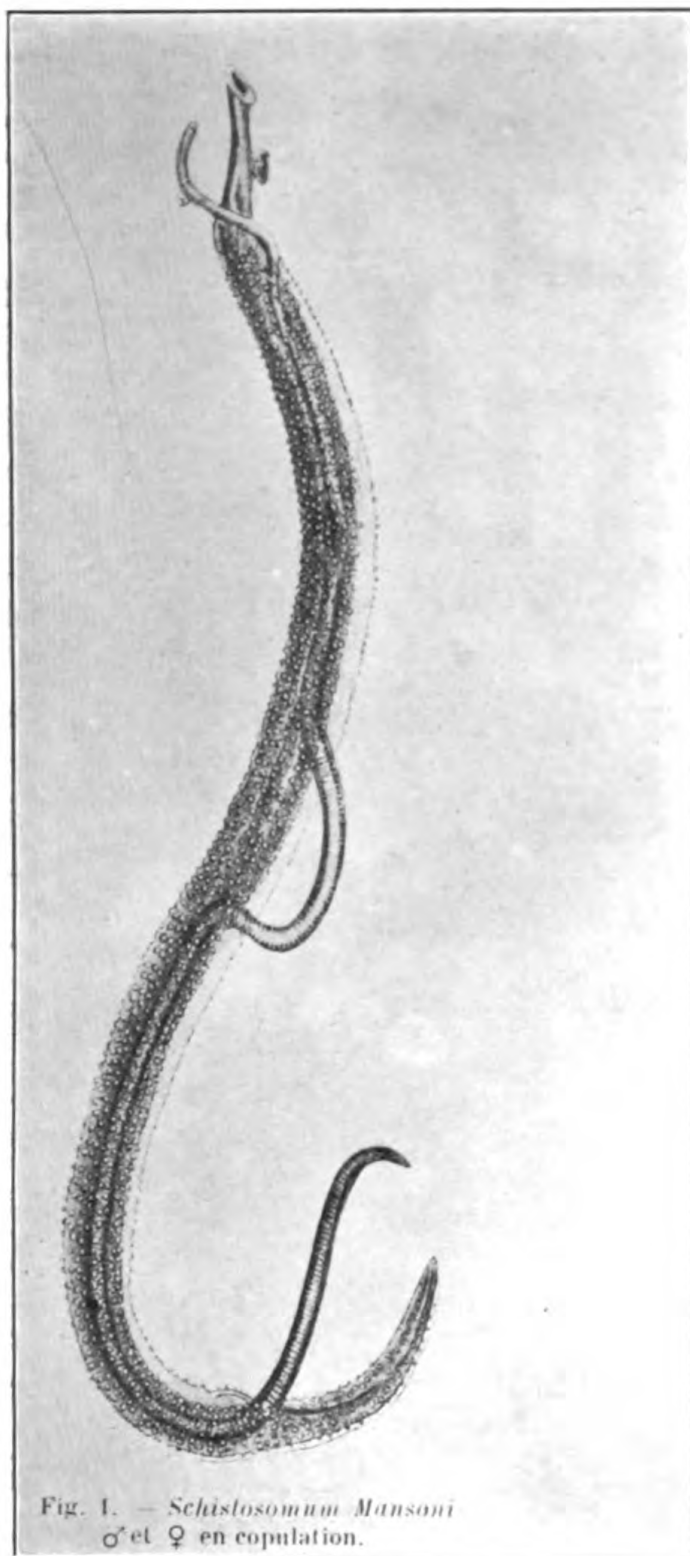
most favorable conditions for the development of the ova and the time required for such development; second, their resistance to varying degrees of temperature, light, to desiccation, and to various strengths of salt solution.

In conducting their experiments to determine the normal conditions for development the sputum was washed in a tall museum jar by allowing tap water to run in violently. After standing for an hour or so the water is decanted off as close to the sediment as possible and the jar refilled and allowed to stand until the following day, when the water is again changed. If after sedimentation the water is perfectly clear it is poured off and the sediment transferred to a bottle and not again disturbed.

Cultures of the ova, including those used as controls for experiments, were kept uncovered, out of direct sunlight and in a temperature varying from 25° to 34° C.

In their experience the factor more important than the temperature was the cleanliness of the sedimented ova and the water in which they were to grow. They never detected segmentation of the germ cell in freshly expectorated sputum. Motile miracidia developed in fifteen days; free swimming miracidia were found after twenty-five days. They state that after thirty days all of the shells contained actively motile miracidia, and the unhatched organisms would persist in the same culture for from one hundred and fifty to one hundred and sixty days. They therefore point out that while the ova develop comparatively uniformly until the miracidia are to all appearances fully mature, the escape of the miracidia from their shells is, for a given number of ova, a matter of considerable variation, and the hatching of the ova thrown out in a single expectoration may be distributed for a considerable period of time—according to their experience, seventeen to eighteen weeks.

By submitting the ova to varying degrees of temperature interesting observations were made. Cultures placed in an incubator at blood heat (37° to 38° C.) not only showed no development, but rapidly degenerated. The same thing occurred if the cultures containing ova in which miracidia had developed were placed in the incubator. Cultures placed in cold storage (9° to 15° C.) showed no signs of development after ten weeks and when removed from cold storage to room temperature never failed to develop motile miracidia in about the same length of time as required for original control at room temperature. Ova from fresh sputum, frozen and immediately thawed, apparently developed as well as the control. Ova frozen for longer than five or six minutes began to show injury in that their development was apt to be delayed. No ova after being frozen solid for over one-half hour gave any sign of development.



TO ACCOMPANY REVIEW LA SCHISTOSOMOSE À BAHIA. (BULLETIN,
OCTOBER, 1909, VOL. III, NO. 4, P. 411.)

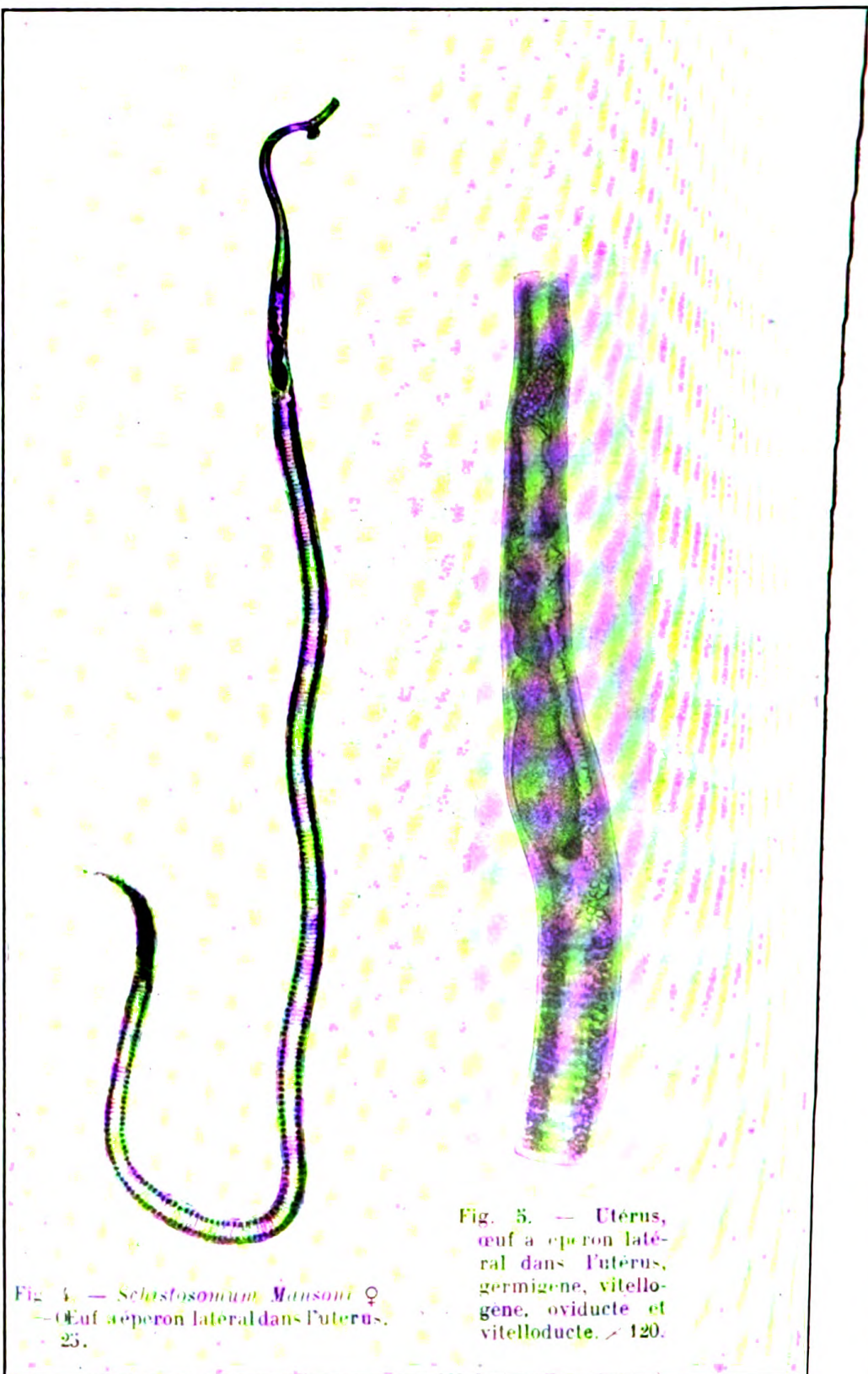


Fig. 4. — *Schistosomum Mansoni* ♀
— Œuf à épéron latéral dans l'utérus.
25.

Fig. 5. — Utérus,
œuf à épéron laté-
ral dans l'utérus,
germigène, vitello-
gène, oviducte et
vitelloducte. $\times 120$.

TO ACCOMPANY REVIEW LA SCHISTOSOMOSE À BAHIA. (BULLETIN, OCTOBER, 1909, VOL. III,
NO. 4, P. 411.)

Ova exposed to direct sunlight rapidly degenerated, and ova from which all light was excluded, developed step by step with the controls, which were exposed to the reflected light of the laboratory room. The ability of the ova of the lung fluke to develop in saline solutions was as follows: In solutions higher than 1 per cent no development took place. In 0.5 per cent solutions development was nearly as good as in tap water; free swimming miracidia were, however, never observed.

The effect of desiccation on the ova was fatal, which disproves the theory of infection of *Paragonimus* in dried sputum or dust. All ova which were allowed to become dry even for a few minutes by evaporation at room temperature failed to develop thereafter. The weight of their experiments goes to show that *Paragonimus* ova are not disseminated otherwise than in water.—(R. C. H.)

NEUMANN, R. L., Dr. med. et phil., Prof. of Hygiene, University Heidelberg. **Studies on protozoan parasites in sea fishes.** (From the zoolog. station at Naples and the hygienic inst., Heidelberg.) *Zeitschr. f. Hyg. u. Infektionskr.* Bd. 64, Heft 1, p. 1.

It has been found that fishes living at the bottom of the sea are infected more often than fishes spending most of their existence in the water above. This has long since been attributed to the fact that such fishes are exposed to attacks by leeches which are the definite hosts of many of these parasites and which, likewise, live at the bottom. The author has found that, with the exception of the high percentage of infections in *Gobius paganellus*, the general average of fishes infected does not seem to rise much above 4 per cent.

The parasites discovered in sea fishes so far belong to the hæmogregarines and the trypanosomes. While trypanosomes and trypanoplasmata have also been found in sweet-water fishes, hæmogregarines have not. Not rarely both hæmogregarines and trypanosomes were found present in the same fish.

The usual method of collecting blood from the small fishes was that, at a point directly behind the head, the spinal cord was severed with scissors and blood taken with a thin capillary tube from the exposed heart; the blood thus collected was at once spread out on object glasses as in the examination of blood for malarial parasites. In middle-sized fishes and the larger ones the heart was also reached from the ventral side. When leeches were to be examined it was found most convenient to introduce a fine capillary tube, without sharp edges, directly through the mouth of the animal into the stomach.

Careful fixation of blood films was found to be absolutely necessary on account of the large size of the blood corpuscles and of the occur-

rence of frequent vacuolization in the protoplasm of these corpuscles and the consequent danger of dislocation of the large parasites within them. With small corpuscles, absolute alcohol gave good results; with larger ones osmic acid and hot sublimate-alcohol were used. The best fixation was obtained on those of the corpuscles that were situated near the margin of the preparation the layers of which had already begun to become dry when the fixing agent was applied.

For staining agents, Giemsa's, Leishman's and hæmatoxylin or hæmatoxylin-eosin were used. The hæmatoxylin, after fixation with sublimate, gave good results. Preparations, successfully fixed in absolute alcohol and exposed to very dilute Giemsa (2 c. c. water, one drop of Giemsa) for three-fourths to one hour did good service, showing the minute structural relations satisfactorily. Unstained preparations had, of course, also to be examined. The hanging drop method was frequently made use of.

Neumann's work is by far the most important contribution to the subject that has yet been made. The great care and painstaking devotion to details of the morphological characters and the development forms of the various parasites studied must be looked for in the original article and do not lend themselves for a brief review.

Among the great wealth of interesting facts brought out by the author he has furnished absolute proof of the fact that the trypanosomes, parasitic on fishes of the sea, are transmitted by leeches. He, likewise, has succeeded in demonstrating the presence of spirochaetes in the blood of fishes for the first time and succeeded, moreover, in discovering two entirely new parasites hitherto unknown to occur in sea fishes: 1, *Globidium multifidum*, in *Gobius minutus* and *Arnoglossus Grohmanni*, and 2, *Immanoplasma scylli* in *Scyllium canicula*.—*Medical Inspector H. G. Beyer.*

MADDEN, FRANK COLE, M. D., Melb., F. R. C. S. Eng. **Two interesting bilharzial conditions.** The Lancet, October 23, 1909, pp. 1204-5.

Commenting upon the apparently lesser severity of manifestations of bilharziosis in other localities than in Egypt, where an actual death rate of over 10 per cent has been shown in the records of the Kasr-el-Ainy Hospital for the years 1907-8, the author proceeds to describe two special forms of bilharzial infection.

(1) Bilharziosis of the penis. (a) Bilharzial deposits in the erectile and subcutaneous tissues: frequently these deposits do not involve the urethra; diagnosis can be made only by microscopic examination of the tissue or by the presence of bilharziosis in other parts: the masses of tissue give no symptoms but inconvenience, but tend later to ulcerate through to the skin or urethra; they can be completely removed by operation.

(b) Bilharziosis of the glans penis and prepuce; a bulbous condition of the end of the penis is presented, involving the first inch or two of the urethra; the meatus is much constricted, but remainder of urethra is clear; there is frequently a discharge which might be mistaken for gonorrhœa; there are usually no fistulous tracts; instead of the partial amputation hitherto performed in such cases, the author advises trying a simple removal of the prepuce and treatment of the stricture, more especially since this form of bilharziosis occurs almost entirely in young boys.

(c) Bilharziosis of the glans, prepuce and body of the penis; in addition to the lesions above described, the skin and subcutaneous tissue of the body of the penis may be involved, and frequently the urethra as well, though not always; with involvement of the urethra, one or several urinary fistulæ may be present, usually on the under surface; in more advanced cases the urethra is more extensively involved and numerous fistulæ run irregularly through a mass of elephantiasis tissue, which may extend to the scrotum and perineum and surrounding parts; testicles are usually unaffected.

In these cases instead of the complete amputation of the penis formerly attempted, the author now does a dissection operation similar to that done in elephantiasis of the penis.

(d) Bilharziosis of the glans penis, ending in epithelioma. A true, malignant, rapidly spreading epithelioma sometimes develops from bilharzial infection of the glans, calling for prompt and radical operation.

(2) Bilharziosis of the anus and surrounding tissues. Two long-standing cases of urinary bilharziosis gradually developed rectal symptoms such as constant tenesmus, difficult and painful defecation, with a muco-purulent discharge. Around the anus was a hard, circumscribed, freely movable mass involving the mucous membrane well above the sphincter and extending well into the rectal fossa; deep discharging sinuses ran back into the tumor, but did not communicate with the rectum; there was no glandular involvement. Under stovaine anesthesia, the entire mass was removed by a circular incision, the cut edges of the rectum being stitched to the surrounding fat; formation of cicatricial tissue in few weeks left a small anal aperture and gave patients practically perfect control of movements.—(P. E. G.)

HARRISON, J. H. HUGH, Colonial Surgeon, British Honduras. **Hookworms and the death rate.** From British Colonial Reports. Jour. Trop. Med. and Hyg., Vol. XII, No. 18, p. 275.

Hookworms are believed to play an important part in the death rate of British Honduras. About 70 per cent of population was shown at post-mortem to be infected; the "American" hookworms.—(P. E. G.)

WISE, K. S., Dr. **Filariasis of the spermatic cord.** From Report of the Surgeon-General of British Guiana, 1907-8, Jour. Trop. Med. and Hyg., Vol. XII, No. 18, pp. 276-277.

Wise reports cases of filariasis in males 20 to 35 years old, showing marked involvement of the spermatic cord, usually on the right side. Usually a fullness below Poupart's ligament is the only outward sign. This may be supplemented by swelling and desquamation of the scrotum, indicating a purulent effusion into the tunica vaginalis.

Post-mortem the cord is found greatly enlarged (2 inches in diameter) from the external abdominal ring to the epididymis; not infrequently it is affected through the ring down into the pelvis.

Acute, purulent hydrocele is commonly present, but the testis itself does not appear to be involved.—(P. E. G.)

GREEK and REICHENSTEIN. **The reaction of the white blood cells to the presence of *Tania* in the intestine of man.** Wiener Medizinische Wochenschrift, 1908, No. 14.

The authors report upon the blood findings in 72 cases of infection with *Tania*. In each case the hæmoglobin content and the number of red cells were practically normal. There was a relative and absolute decrease of the neutrophile polymorphonuclear leukocytes from 70 to 75 to about 58 per cent. The eosinophiles and lymphocytes were relatively and absolutely increased, the latter from about 25 to about 35 per cent.—(P. E. G.)

TROPICAL MEDICINE.

Surg. C. S. BUTLER, U. S. Navy.

DARLING, SAMUEL T. **The relapsing fever of Panama.** Archives of Internal Medicine, vol. 4, No. 2, Aug. 15, 1909.

Darling gives the results of his investigation of the relapsing fever of Panama. His conclusions are that Panama relapsing fever is distinct from the analogous fever of Europe, Asia, and Africa, although belonging to the same general class.

The etiological spirochete of this fever is in the same group with *Sp. obermeieri*, *Sp. duttoni*, and *Sp. carteri*. It causes a recurring infection in man, monkeys, and white mice, and single paroxysms in white and wild rats. Its animal reactions are similar to those obtained by several investigators with the organism erroneously identified by Novy and Knapp as *Spirillum obermeieri*.

The blood of animals very recently recovered from an infection and that between paroxysms, where spirochetes are apparently absent

from the peripheral blood, is infectious, and by analogy this affords a valuable means of diagnosis of the fever in man during the afebrile period by the inoculation of susceptible animals, as mice and rats, with the patient's blood.

Variation in the morphology of the spirochete in the same strain and sometimes in the same smear exists. Identification on morphological grounds is not possible.

The mechanism of defense is largely that of phagocytosis by the hepatic endothelium. Infected animals sacrificed at different stages of the infection show an increasing number of fragmented spirochetes engulfed by endothelial cells of the liver. Liver emulsion from animals which had recently recovered from an infection was found to be more infectious than the heart's blood, suggesting a probable vitality and unity of fragments.

Infection gives considerable active immunity against the infecting strain, but such immunity is not potent against another strain from a different source, although of the same species and from the same locality. Preventive and curative sera must therefore be polyvalent. The blood of recovered subjects is of no value in preventing infections in white mice and white rats.

Relapses may be explained by multiplication of spirochetes in places where they do not enter the portal circulation and can not be engulfed by the liver endothelium. Agglutination of this spirochete occurs at least twenty-four hours before the crisis.

This spirochete is probably a spiral ribbon and not a spiral cylinder. Reclassification of the group of spiral-shaped microorganisms on a basis of morphology, pathogenicity, and habitat is needed. This spirochete is more closely related to bacteria than to protozoa. It should be possible to demonstrate specific opsonins. The mode of infection by this spirochete is probably through some suctorial insect or acarid.

Note by reviewer.—Apropos of Darling's paper on the spirillosis (human) of Panama, it is interesting to note that Colonel Leishman has described (*Journal Royal Army Medical Corps*, February, 1909) certain small chromatophorous bodies which develop upon the spirochete of African tick fever when taken into the stomach of the intermediary host of this disease. These bodies, after losing the spirochete, are found in the ovary of the tick, and he has been able to demonstrate them also in the eggs laid by infected ticks. He reasons that it is these bodies (which he considers protozoal in nature) which carry the infection of tick fever to young ticks and make it possible for the second generation to infect man.—(C. S. B.)

BRINCKERHOFF, W. R., and MOORE, W. L. **Studies upon leprosy. Upon the utility of examination of the nose and nasal secretions for the detection of incipient cases of leprosy.** Public Health and Marine-Hospital Service, 1909.

In this bulletin these workers outline their investigation of Sticker's theory that the nasal septum is the site of the initial lesion in leprosy, and they conclude that—

I. The routine examination of the nasal septum and the nasal secretions of individuals of a race with a high incidence of leprous infection did not reveal as many cases of leprosy as would be expected from statistical data had the method been an efficient one for establishing a diagnosis of the disease in the incipient stage.

II. The examination of the nasal septum and the nasal secretions is not of dominant value in confirming a diagnosis of leprosy in the early stages of the disease.

III. The conditions found in the noses of leprous children of leprous parents do not differ in important respects from those found in descendants of non-lepers.

IV. When it is not practicable to make a complete physical examination of an individual of a class suspected of leprosy, the examination of the nasal secretions will prove of value by permitting the recognition of the most dangerous type of the disease, and is therefore worth while even if it does not reveal all cases of the disease in those who come under observation.—(C. S. B.)

BLUE, RUPERT. **Antiplague measures in California.** Journal of Hygiene, Vol. X, No. 1, April, 1909.

He describes the antiplague measures in San Francisco County, Cal., and concludes by summarizing the plague-eradication measures as follows:

A simultaneous attack upon the habitation and food supply of the rat. The destruction of rat burrows and nesting places. The separation of the rat from his food supply by concreting and screening such places as stables, warehouses, markets, restaurants, etc. The prevention of entry of the rat into human habitations by the use of concrete or other impervious material on the ground area, or by elevating the building so as to allow free access to the natural enemies of the rat beneath the same. Disinfection of rat burrows by the use of strong antiseptic solutions and chloride of lime in places likely to furnish fleas. Disinfection of buildings in which either human or rodent cases have occurred; this last measure is not considered as important as rat extermination. All the human cases were isolated in a rat-proof compound.—(C. S. B.)

DARLING, SAMUEL G. **Histoplasmosis.** Journal of Experimental Medicine, Vol. II, No. 4, July 17, 1909.

The author describes a fatal disease resembling kala-azar occurring in the Canal Zone and probably in other Central and South American countries. The author had seen three cases of this disease and describes the symptoms and autopsy findings. Clinically,

emaciation, splenomegaly, irregular fever, anæmia, and a low white count are observed. Anatomically, the endothelial cells of the lymph glands, blood vessels and capillaries are invaded by enormous numbers of a small (1 to 4 microns) encapsulated organism which he calls *Histoplasma capsulatum* and which causes necroses of the liver with cirrhosis, splenomegaly, pseudo-granulomata of the lungs, the small and large intestines (with ulceration) and necrosis of the lymph nodes draining the infected viscera.

The organism is a small, round or oval body, possessing a polymorphous chromatic nucleus, basophilic cytoplasm, and achromatic spaces, the whole inclosed by an achromatic refractive capsule and differing from the Leishman-Donovan body in the form and arrangement of the chromatic nucleus and in possessing no chromatic rod.—(C. S. B.)

BARRETT, J. O. W., and YORKE, W. **Blackwater fever.** *Annals of Tropical Medicine and Parasitology*, Series T. M., Vol. III, No. 1.

These writers give the mechanism of production of blackwater fever. It is impossible to do justice in a brief to this excellent work; the results are therefore given in their own summaries:

SECTION I.—*The hæmolysis of red blood cells by quinine and also by acid, alkali, and urine.*

Results of investigation.—1. Quinine bihydrochloride and quinine in the alkaloidal state produce hæmolysis of red blood cells, as do also hydrochloric acid and sodium hydrate.

2. The action of quinine in the alkaloidal state in producing hæmolysis resembles a catalytic action.

3. Hæmoglobin breaks up at a monomolecular rate under the action of quinine in the alkaloidal state.

4. The above-mentioned four hæmolytic agents possess, in equimolecular concentration, nearly the same hæmolytic power, quinine in the alkaloidal state being weaker, and quinine bihydrochloride stronger than hydrochloric acid and sodium hydrate, which occupy an intermediate position.

5. Owing to the toxicity of quinine, its concentration in the blood can not reach an amount sufficient to allow of its direct hæmolytic action on red cells taking place during life.

6. The red-blood cells during blackwater fever are not hæmolysed by quinine bihydrochloride more readily than in health.

7. In the presence of urine, hæmoglobin, whether contained in red-blood cells or in solution, is broken up. In the former case this proceeds at a monomolecular rate, no hæmoglobin being discharged from the red cells into the urine until destruction is nearly complete.

8. The constant, μ , for the hæmolysis of red-blood cells was found to have a mean value of 15,000 for a 0.00113 M. solution of alkaloidal quinine. The value of μ for the destruction of hæmoglobin in the presence of urine ranged, in the experiments made, from 13,000 to 30,000. The values of $K_{5.0}$ ranged in the former cases from 0.0026 to 0.0087, and in the latter case from 0.0026 to 0.0039.

SECTION II.—*The relation of hæmolysinæmia to the hæmoglobinuria of blackwater fever.*

Results of investigation.—The hæmoglobinuria of blackwater fever is not dependent upon hæmolysinæmia.

SECTION III.—*The relation of hæmoglobinaemia to hæmoglobinuria in blackwater fever.*

Results of investigation.—1. In oxalated blood plasma obtained from healthy individuals, 0.10 per cent, or less, to as much as 0.25 per cent. of dissolved hæmoglobin was found; in oxalated blood plasma obtained during blackwater fever, while the urine in the bladder still contained hæmoglobin, the amount of dissolved hæmoglobin was usually, but not always, greater than this, ranging between 0.30 per cent and 0.95 per cent.

2. Hæmoglobinaemia produced experimentally in the rabbit is accompanied by hæmoglobinuria, the percentage of hæmoglobin in the urine quickly surpassing that in the blood plasma, and subsequently falling as the latter diminished.

3. The disappearance of dissolved hæmoglobin from the blood plasma proceeds in the living body of the rabbit at approximately the same rate as a monomolecular chemical reaction.

SECTION IV.—*Mechanism of production of suppression of urine in blackwater fever.*

Results of investigation.—1. During experimental hæmoglobinuria dependent upon hæmoglobinaemia, as also in the hæmoglobinuria of blackwater fever, granular casts of varying size, sometimes very soft, sometimes firm and dense, often containing degenerated nuclei derived from the epithelium of the renal tubules, were met in the urine.

2. During suppression in blackwater fever the urine contained very large firm casts with exceedingly coarse granules, often surrounded externally by epithelium derived from the ducts of Bertini, in which these casts were formed.

3. The amber-colored urine passed during suppression contained a large amount of coagulable proteid. The average daily amount of urine passed during nine days of suppression was in one case 28 c. c., in another case 66 c. c.

4. Suppression of urine in blackwater fever is of mechanical origin, due to a blocking of the renal tubules.

SECTION V.—*The mechanism of production of blackwater.*

Results of investigation.—1. In the urine in blackwater fever red cells may be found during hæmoglobinuria, usually in very small numbers.

2. In blackwater fever the hæmoglobinuria which occurs is the result of an accompanying hæmoglobinaemia.

3. Sufficient data are not available to determine the situation in which laking of red-blood cells leading to hæmoglobinaemia occurs in blackwater fever.

ADDITIONAL NOTE.—Hæmoglobinuria in the dog, due to *piroplasma canis*, is similar in its mechanism of production to that of blackwater in the human subject; that is to say, the hæmoglobinuria is attended with and dependent upon hæmoglobinaemia.

SECTION VI.—*The condition of the kidneys in blackwater fever.*

Results of investigation.—1. During simple, uncomplicated hæmoglobinuria of blackwater fever the sole pathological condition existing in the kidneys would

appear to be the presence of brown granular material in the lumen of the renal tubules.

2. Venereal disease does not appear to influence either the tendency to blackwater fever or its severity when present.

SECTION VII.—*Icterus and blackwater fever.*

The statement is frequently made that icterus occurs in blackwater fever. There is in blackwater fever a yellowish tinting of the skin and of the sclerotic coat of the eyeball but this condition is not accompanied with bile pigment in the urine, and hence is not true icterus. It is asserted by Koch that administration of quinine for blackwater fever will induce an attack of icterus, hæmoglobin being converted into bile pigment, which appears in the urine.

SECTION VIII.—*Remarks on the prophylaxis and treatment of blackwater fever.*

All the usual precautions against malaria are doubly important in countries in which blackwater fever is prevalent. Administration of quinine to a patient suffering from malaria who has previously suffered from blackwater fever presents the possible risk of inducing a recurrence of blackwater, whereas an avoidance of quinine may expose the patient to a greater risk of fatal issue from complications of malaria.

Suppression of urine is a complication common in blackwater fever and a frequent cause of death. Since the tendency to plugging of the renal tubules is less likely to occur when the flow is rapid, in all cases of blackwater fever the secretion of urine should be encouraged by diuretics. In cases of suppression nephrotomy has proven beneficial as affording a mechanical outlet to relieve the blocking of the renal tubules, but is not of much use if blocking of the renal passages is very extensive.—(C. S. B.)

HYGIENE AND SANITATION.

Medical Inspector H. G. BEYER and Surg. P. L. PLEADWELL, U. S. Navy.

KALHÄNE, Dr. W., Stabsarzt, and STRUNK, Dr. H., Korps-Stabs-apotheker. The processes for the disinfection of dwellings with formaldehyde and potass. permanganate, the amounts of gaseous formaldehyde given out in each and their practical significance. (From the chem.-hygienic laboratory of the Kaiser Wilhelms Akademie, in Berlin.) *Zeitschr. f. Hyg. u. Infektionskr.* Bd. 63, Heft 3, p. 377.

The extraordinary practical value generally accorded to disinfection with formaldehyde would seem to make very desirable an account of this work more detailed than is ordinarily given.

When a solution of formaldehyde and potass. permanganate, in the form of crystals or powder are brought together, the formaldehyde is oxidized to formic acid and carbon dioxide, respectively. The heat set free during the process of oxidation is so great as to cause the mixture to reach the boiling point when certain quantitative relations are maintained. In a disinfection, to prove satisfactory, the quantity of water evaporated during the process must be such as to insure the complete saturation of the air of the room to be disinfected. It is only when this condition is fulfilled that the evaporated formaldehyde produces its full bactericidal effect.

The formaldehyde water-vapor mixture is produced by the heat which is developed during the oxidation of part of the formaldehyde. This reaction is more or less active in accordance with the relative quantities of the ingredients used in the mixture, and the amount of formaldehyde itself depends on the amount of heat set free during the resulting reaction. Since the utilization of the heat, very naturally, is not as thorough in experiments in vitro with relatively small amounts as it is with larger quantities, the consequences must be that in all experiments in which the quantities of the ingredients used are below those employed in practical disinfecting work, smaller amounts of formaldehyde gas are generated than in experiments on a larger scale.

In their experiments for the determination of the amounts of formaldehyde evaporated in the several processes the indirect method devised by Strunk was used: In the residue, left after the generation of formaldehyde gas has ceased, there were found formaldehyde, formic acid, potass. carbonate, manganic and manganous oxide and undecomposed potass. permanganate. An exact determination of the products of the oxidation of formaldehyde is difficult to make. Portions of these products undoubtedly escape along with the evaporated formaldehyde. Very simple, on the other hand, is the calculation of the evaporated formaldehyde from the amount of potass. permanganate used up in the oxidation.

When the formaldehyde and the other oxidation products, such as formic and oxalic acids, remaining in the residue are completely oxidized into CO_2 by the further addition to it of potass. permanganate in an alkaline solution, it becomes easy to calculate, from the amount of permanganate used in the beginning and at the end, how much of the formaldehyde was oxidized to CO_2 during the process of disinfection. This quantity, subtracted from that employed in the beginning, gives the quantity of formaldehyde evaporated. It was also found that the amount of formic acid evaporated during the process of disinfection was so small as to be practically negligible.

It is of great importance to note the amount of water that is evaporated, along with the amount of unoxidized formaldehyde during disinfection, and this was done in several experiments made with both small and large quantities of the ingredients (for details see original article).

Basing themselves upon numerous experiments, the authors conclude that the relative proportions best answering the purposes of a satisfactory disinfection are: 1 part of formalin, 3 parts of water, and $2\frac{1}{2}$ parts of potass. permanganate. When 1,200 c. c. of a solution of formaldehyde (36.76 per cent), 720 c. c. of water, and 1,440 gms. of potass. permanganate were used, an examination of

the residue resulted in showing that 51.2 per cent of the original amount of formaldehyde present had been evaporated. The loss in weight of the mixture being 872 gms., the proportions of the evaporated formaldehyde to the evaporated water were as 1 to 6.

The test objects used in the experiments were: *bact. typhi*, *bact. pyocyaneani*, *staphylococcus pyog. aur.* and spores from garden earth; these were exposed in Petri dishes, judiciously distributed in a room of 40 c. m. capacity and suitably warmed. Exposure 5 hours.

Results obtained with:

1. *The formalin-permanganate process.*—In one of the experiments about 4 gms. of formaldehyde and 28 gms. of water per cubic meter of space were shown to have been evaporated. No growth was noted in any of the test objects, with the exception of some of the spores from garden earth. In a second experiment, in which 5 gms. of formaldehyde and but 20 gms. of water per cubic meter had been evaporated, the results were shown to be even more favorable. While the disinfecting value of formaldehyde depends on the room air being supersaturated with water vapor, it must likewise increase with the percentage of the gas contained in the vapor.

2. *The autoform process.*—Autoform or festoform is a soap preparation with formaldehyde, of the consistency of lard, occurring in tin boxes; each box is accompanied by potass. permanganate and, besides, by an ammonia developer; the whole is known as the autoform process. The two experiments with this process made in the same chamber and on the same test objects, similarly distributed, gave results much less favorable than those that were obtained with the formalin-permanganate process.

3. *The formangan process.*—The formangan of Edward Schneider-Wiesbaden comes in tin boxes, in blocks of the form, color, and consistency of cottage cheese; it is accompanied by potass. permanganate in the form of powder and contains 64.9 per cent of formaldehyde. The preparation is dissolved in a certain quantity of water and the potass. permanganate is then added. In accordance with the directions, 550 gms. of the formaldehyde preparation were mixed with 800 gms. of potass. permanganate and 1,050 gms. of water. The proportions contained in the mixture were: 1 formaldehyde, $2\frac{1}{2}$ potass. permanganate, and $3\frac{1}{2}$ water, the whole in an enameled tin bucket. All the vegetative germs were killed and even some of the spores, while some of the latter showed retarded development.

One of the objections to the method is that the preparation will not keep long enough; hard lumps form in the interior of the block, due to the polymerisation of the formaldehyde.

4. *The autan process.*—The mixing of the paraform with barium-superoxid is a little hard on the disinfector on account of the dust that it causes; the development proceeds with great rapidity under

foaming and the formation of a thick cloud. Paraform is oxidized only to formic acid, not carbonic acid, and but 22 to 25 per cent of it is converted into gas; the developed heat and the corresponding water evaporation are less than in the other processes. The disinfecting value of the method is that of 2.5 gms. of formaldehyde per cubic meter of air space. Some of the exposed vegetative germs escaped the bactericidal action, and all the spores developed.

5. *The Breslau apparatus* (Flügge's method) gave excellent results, and showed that 5 gms. of formaldehyde and 30 gms. of water per cubic meter of air space were evaporated.

A comparative estimate of the several processes thus far described shows that the permanganate process is far better than the autan process, because the formaldehyde is oxidized to a greater extent by the permanganate than by barium-superoxid, consequently, a smaller quantity of formaldehyde need be sacrificed to get the heat that is necessary for a satisfactory evaporation. The vessels required in all the processes (including the festoform and formangan) are the same, namely, they must correspond in size and capacity to 1 liter for every cubic meter of room capacity to be disinfected. The amount of water to be evaporated in order to secure saturation naturally depends upon the temperature of the air. The objections adherent to the permanganate process have not been removed by the festoform method. The formangan process gives good results as long as the preparation is fresh; the fact that it does not keep makes the preparation unreliable.

6. *The paraform-permanganate process.*—Although the processes so far considered give good results for field use, it remains desirable to limit the necessity for the use of liquids. The authors, for this reason, experimented with paraform. They found, among other things, that the causes of certain paraforms not developing the necessary amount of formaldehyde as did others was due to the fact that they contained substances inhibiting this reaction, probably formic and acetic acids. Formic acid is oxidized but slowly by permanganate, and acetic acid also retards the reaction. But these substances can be removed by the proper modification of the process. It was also found that the size of the vessels used in the process might be reduced to one-fifth of that necessary in the other processes. An enameled wash basin of 7 liters' capacity would, therefore, suffice for the disinfection of a room of 40 c. m. capacity. The process is as follows: The paraform is put into an enameled iron basin, the permanganate, in the form of crystals, is added, and the two are mixed until a uniform color is produced by stirring with a wooden stick. When mixed thoroughly, a measured quantity of water is added, and the stirring is kept up until a uniform

paste results. The reaction is slow enough to enable the disinfecter to do his work thoroughly without molestation. In case the paraform should contain more than the ordinary amount of formic acid, a small addition of soda must be added to neutralize it. A thorough moistening of the entire mass with water is necessary; otherwise the manganic residue begins to glow. That the residue, under certain conditions, may begin to glow is no disadvantage to the process, since only iron vessels are to be used.

After carefully weighing the experimental facts brought forth in their work, the authors recommend the following proportions: Paraform, 1; permanganate, $2\frac{1}{2}$; and water, 3. Since about 45 per cent of the paraform is delivered in the form of gaseous formaldehyde, 10 gms. of it must be allowed for each cubic meter of room capacity, or, for a room of 40 c. m. there is needed 400 gms. of paraform, 1,000 gms. of potass. permanganate, and 1,200 gms. of water. Numerous experiments have shown that 1 per cent of calcined soda to paraform suffices to produce a reaction in all the forms of paraform appearing in commerce. Potass. permanganate must be pure; the crude article will not do.

With the above-named proportions about 44.9 per cent of formaldehyde is evaporated. In a room of 40 c. m. capacity there were evaporated, per cubic meter, 4.49 gms. of formaldehyde and 21 gms. of water.

The advantages of the paraform-permanganate process are:

1. As compared with the autan process:

(a) That the reaction begins later than with autan, so that the disinfecter has plenty of time to mix the ingredients thoroughly before being disturbed by the developing gas.

(b) That with the same quantity of paraform as in autan, the process gives almost double the amount of gas in formaldehyde and one and one-half times the amount of water vapor. It costs less.

(c) That the vessels employed may be one-fifth of the capacity of those necessary in the other processes and may consequently be found present in every household.

2. As compared with formalin method:

(a) It employs only solid substances and their transportation is easier.

(b) Both the formalin-permanganate process and the autan process require large vessels; the paraform process does not.

(c) In the formalin-permanganate process gases begin to rise at once; in the paraform process the disinfecter has ample time to do the thorough mixing before being interrupted by gas, so that one man suffices for the disinfection of very large rooms.—(H. G. B.)

BOEHNCKE, DR. KARL ERNST, Stabsarzt. Comparative investigations on the practical values of certain methods of disinfection with formaldehyde without the employment of any apparatuses. (From the hygienic institute of the university of Berlin.) *Zeitschr. f. Hyg. u. Infektionskr.* Bd. 63, Heft 3, p. 444.

The author, after experimenting with most of the ordinary processes of disinfection in which formaldehyde is the chief disinfecting agent, gives the decided preference to a modification of the method of Doerr and Raubitschek proposed by Lösener. The following brief description of one of the experiments must suffice to give an idea of this modified method: In a room of 36 c. m. capacity and without sealing windows and doors in the usual way, 1,280 c. c. of formalin, with the necessary quantity of water, were put into an earthenware pot of 20 liters capacity. To this was added, under constant stirring with a wooden stick, 1,280 gms. of potass.-permanganate. Twenty-five seconds after the addition of the formalin-water solution the reaction began and became very active. Some of the contents were scattered on the floor. The temperature rose 4° C. in five minutes and 7° C. in fifteen minutes. All the test objects had been rendered sterile after an exposure of four hours.

The method was also very successfully tried on the compartments of railroad cars.—(H. G. B.)

FAICHNIE, N., Major R. A. M. C. Fly-borne enteric fever—The source of infection. *Journal Royal Army Medical Corps*, Vol. XIII, No. 5, Nov., 1900, p. 580.

It had been noted in Nasirabad, India, that a systematic raid on flies, especially on their breeding grounds, was followed by a diminution in the typhoid fever rate. That this diminution could not be due solely to antityphoid inoculation was apparently shown by the fact that many of those present had not been so inoculated, and others who had been several years before showed but slight remaining protection, to judge from the feeble agglutinin-reactions given by their serums. Moreover, an examination of 60 men, who had had typhoid fever before, revealed the fact that two of these had been bacillus-carriers since 1906; so that it could not be said that any extraordinary precaution had been taken against direct infection.

The Mhow water supply being taken from a pure source and not requiring boiling, there seemed to be little doubt that the essential cause of the improvement was the fact that flies had been prevented from breeding on the trenching grounds.

The author, from his further observations and experiments, comes to the conclusion that it is not so much the fly that has *fed* on the excrements that conveys the infection as it is the fly that was *bred* on infected material that conveys it. Nor does he believe that the germs are often conveyed on the legs of the flies. A freshly hatched fly, he

says, in the trenching grounds looks very clean about its legs, and the chance of the survival of the delicate *B. typhosus* on these clean legs after the fly has walked about the sun-scorched soil seems very remote. As it takes ten days for a fly to hatch, the soil on which it was bred will be practically sterilized by the heat and light of the tropical sun, so that the winged insect had no chance of infecting itself further. Such a fly, to carry infection by its own excrements, must have become infected during the process of hatching. Indeed, when such flies were caught, their legs and surface sterilized in the flame, their intestinal contents were found to contain thousands of typhoid bacilli.

The author therefore concludes that infection by flies' legs, natural though it may appear, is not a common nor even a considerable cause of enteric fever; that, on the other hand, infection by flies' excrements, bred on infected material, explains many of the former conclusions that it had been difficult before to accept. It is, in a word, the breeding grounds of flies that determine whether flies carry infection and not the grounds on which flies merely feed.---(H. G. B.)

KITASATO, S., Professor Dr. **Tuberculosis in Japan.** *Zeitschr. f. Hyg. u. Infektionskr.* Bd. 63, Heft 3, p. 517.

According to Kitasato, tuberculosis occurs and spreads in Japan the same as it does in other parts of the world. The author even shows plainly from the most recent statistics that, since 1900, the annual death rate from pulmonary tuberculosis has shown a steady increase up to the present time. Such an increase in a country in which tuberculosis in man is independent of the coexistence of bovine tuberculosis is, to say the least, very remarkable, especially so when measures for its prevention are up for consideration. The statistics furnished by our distinguished Japanese professor go far to support Koch's original contention that the chief danger from human tuberculosis is the tuberculous man.

Kitasato, with his able assistant, S. Ogata, examined with the greatest care and scientific accuracy 152 phthysical patients, among which there were 5 with intestinal and 1 with renal tuberculosis; and who, during the time that they were kept under observation, took no butter or milk which had not been thoroughly boiled.

Inoculation of guinea pigs and cultures on glycerin agar showed the presence of tubercle bacilli in all the 152 patients. From every one of the cultures obtained from the inoculated and tuberculous guinea pigs, two rabbits were inoculated subcutaneously on the abdomen with 0.01 gm. of the culture suspended in 1 cc. of normal salt solution. Of the rabbits, when killed three months after inoculation,

not one showed generalized tuberculosis. In not a single one of the 152 patients could the existence of tuberculosis bacilli of the bovine type be discovered!—(H. G. B.)

KÜLZ, Dr. The destruction of mosquitoes by the French in West Africa by the "trous-pièges." Arch. f. Schiffs u. Tropen hyg. Bd. XIII, Heft 30, p. 645.

In West Africa where mosquitoes are most abundant and where not only the anopheles but also the stegomyia thrived, their destruction constitutes an important sanitary measure in the prevention of both malaria and yellow fever. Doctor Blin, the originator of this method of extermination, and at the time physician in chief at Conakrys (Dahomey), had noticed that the mosquitoes were in a habit of collecting in large numbers in crab holes, such as occur in places near the coast, and there pass the hottest time of the day away from the heat and light of the sun. This observation gave Doctor Blin the first clew to his plan for the destruction of mosquitoes.

Holes, about $1\frac{1}{2}$ feet in depth, the axis of which ran at an acute angle with the surface, were dug. The outer opening was turned away from the prevailing breezes and so placed that the sun's rays could not strike it directly.

It was noticed that these places were sought out by the mosquitoes in large numbers from about 8 a. m. The darker the earth and the more shady the surroundings the more numerous also were the mosquitoes that collected in these holes. The mosquitoes would remain in the holes until about 4 p. m., when they began to leave these places. Their destruction, therefore, had to be planned before that time, and this was done through the introduction into their hiding places of burning petroleum torches. The torches consist of sticks about $4\frac{1}{2}$ feet long, one end of which has a piece of burlap or some oakum wrapped around it that is soaked in petroleum. Since these torches keep burning about 10 minutes, after being once lighted, one of them may be used to flame from 15 to 18 such holes, when the latter are not located at too great distances from one another.

The holes are dug with a long narrow spade, armed with a short handle, and the same holes may be used for ten to twelve days in succession, needing only an occasional repair. One man may easily dig 100 of them in a day. An interval of 45 feet is allowed between each pair of holes; the more shrubbery there is in a place, the nearer they can be together.

Doctor Blin, in Kotonon, during a yellow-fever epidemic there, organized squads of 6 men each; every man carried five torches, of which one, already lighted at the start, was carried in the right hand; the other four, soaked but not lighted, were carried over the left

shoulder. With the one in the right hand, the man would run from hole to hole until the torch ceased to burn; he would then light the next torch, and so on to the end.

The smoking out of the holes must be done between 2 and 3 p. m. With practice 6 men with 30 torches suffice to burn out 500 holes in one and one-half to two hours. Five hundred of these traps consume about 3 liters of petroleum.

Doctor Blin, on counting the number of mosquitoes in ten such "trous-pièges," or trapholes, for fifteen consecutive days, found an average daily number of from 600 to 1,100 mosquitoes. The total number in the ten holes was 11,700. The method has also been applied, with some modification, to the interior of houses and dwellings.—(H. G. B.)

OUARD, médecin de 1^{re} classe de la marine, *Le Croiseur L'Alger en Extrême-Orient*. (The cruiser Alger in the Far East.) Archives de Médecine Navale, No. 9, September, 1909.

This article deals with a number of prominent hygienic and sanitary questions arising in connection with a cruise of the *Alger* in ports of the East, during the years 1906–1908, and is followed by a series of clinical observations on certain medical and surgical maladies appearing on board that vessel while in those ports.

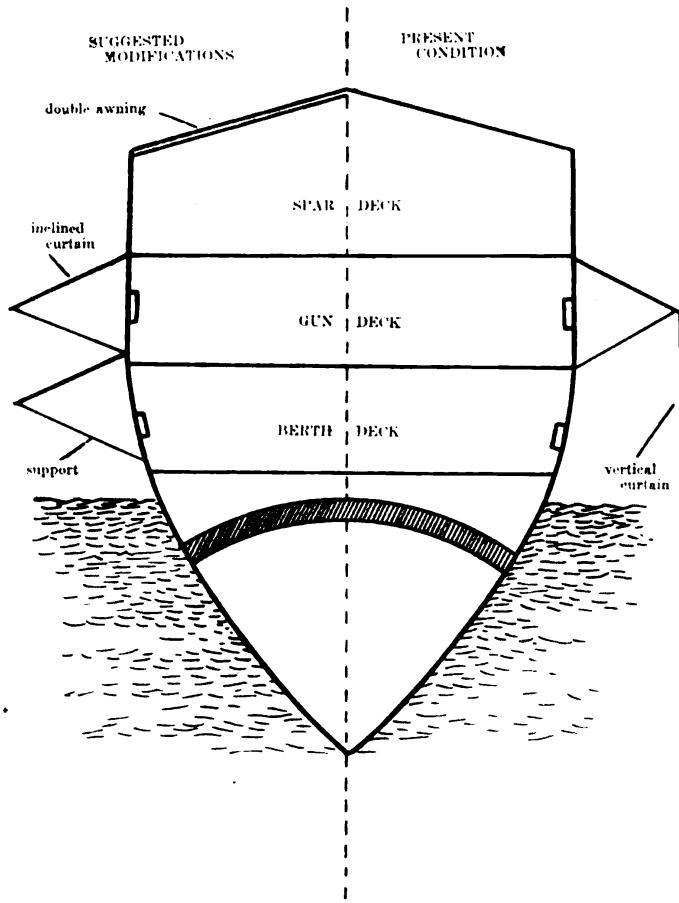
Temperature.—Oudard invites attention to the well-known fact that the temperature of the contained air of a ship is powerfully affected by the conduction of heat rays of the sun through the steel sides of the ship, and remarks that the French eastern squadron has fortunately adopted white paint for the painting of hulls. He suggests several modifications of awnings and hull side curtains, designed to minimize the transmission of solar heat through the ship's sides, especially when in the tropics. He asserts that awnings should be doubled, the air space between the two awnings constituting a better protection than the use of a special heat-preventing layer or facing on the usual single awning.

With respect to hull side curtains, he deprecates the use of the vertical section which extends from the edge of the projecting roof, nearly to the water, cutting off the breeze and preventing the circulation of air, the air so contained often rising in temperature 3° to 4° C. higher than the outside air. To remedy this condition, he recommends the abolition of the vertical curtain and the use of the inclined curtain on both the level of the gun and berth decks, as shown in the annexed figure.

With this modified disposition of hull side curtains, he remarks that only the less objectionable oblique rays at sunrise and sunset obtain access to the ships sides, the vertical rays of midday being

prevented from entering, while the breeze and diffused light are freely admitted.

Water.—Oudard states, with respect to water used on the *Alger*, that prior to June 30, 1907, fresh water obtained in the ports was used for washing and cooking, distilled water being reserved exclusively for drinking. This practice, he remarks, may be dangerous, for while the shore water used for cooking is supposed to be brought to the boiling point, it is questionable whether this is always done, and men will occasionally drink it to avoid the trouble of waiting at an overcrowded scuttle butt. Furthermore, even in cooking, it is



doubtful whether the interior of certain cooked articles, such as loaves of bread, achieves a temperature sufficiently high to destroy all germ life. For these and other reasons, after the above mentioned date, distilled water was used for cooking, and during the epidemic of cholera at Shanghai in October, 1908, distilled water was also used for washing and bathing purposes.

Cementing of water tanks and intermediate reservoirs.—Oudard gives in some detail the methods employed in cleaning and cementing water tanks, and as this is a matter of general interest to naval surgeons, these methods are given in detail. The interior of the tank

to be overhauled is first scraped, brushed with a steel-bristled brush, and then flamed with a blowpipe soldering lamp. The bottom of the tank being more exposed to vibrations and shocks and in constant contact with contained water, then receives a layer of Portland cement a finger's breadth in thickness, composed of 3 kgs. of cement to 1 liter of water. A second coat is applied after drying forty-eight hours, and this coat is allowed to dry for the same period. The use of boiled water (for mixing the cement) and cleanliness of the cleaner are enjoined. The proportions of cement used represent those considered best after trial. If made of greater consistency (than 2 kilos to 1 liter of water) the cement does not adhere as well to the surface of the iron and becomes detached in small scales, and it was found that a mixture of lime with the cement made too friable a coating.

After the cementing process, in order to protect from any contamination which might have occurred, the tanks are washed with a strong solution of permanganate of potash, the manhole plate then being screwed down and covered with a thick layer of lime. The first water which accumulates being charged with permanganate and calcareous salts is not used, but the subsequent supply is usually of good quality. According to the writer this cleansing should be done every six months.

Clothing.—The regulation knitted shirt is stated to be too thick for tropical use, and has sleeves that are too long. For the Far East there should be added to the men's clothing outfit two large thin shirts of open mesh material, which are an absorbent of free perspiration. The new fabric known in commerce as "cellular tissue" might be particularly advantageous on account of its strength. Oudard states that the issue of a regulation sock would be useful, each man to have a number of pairs. Besides being more cleanly, the wearing of socks would diminish the abrasions of the feet which are produced by contact with the interior of boots.

Medical service.—Medical Memorandum Book (health record). It would be advantageous for each enlisted man to have a small medical record book, which would ordinarily remain in the sick bay, in which might be entered height, weight, chest measurements, vaccinations, and revaccinations, together with a short and succinct medical history.

Upon the transfer of the man the record would be transmitted to the medical officer of the station or ship to which the man was going, or sent to hospital whenever a man was transferred for treatment. [In this connection see page 59 of this issue.]

This would constitute a valuable aid to a medical officer in making known to him the resistance of each man and disclosing habitual simulators of disease.

These records would preclude the designation for distant service of those men who through negligence or design fail to inform the

medical officer of certain anterior diseases (dysentery, bronchitis, etc.) capable of being a cause of an early and expensive invaliding home. There is hardly a medical officer in the navy who could not recall instances of this sort.

There might be entered on the medical record of syphilitics all the information at present carried on the loose leaves, which many lose. One might also insert in these records the certificate of origin of wounds and disease.

Every ship on foreign service should be provided with a microscope and stains. Often isolated from brother officers, by means of the instrument the medical officer would be enabled to confirm a diagnosis of disease which might result in serious consequences, determine the question of invaliding home, and certify to the origin of the disease. The clinical microscope would be extremely useful and would permit of interesting observations in obscure diseases in these countries.

We require for ships in these ports considerable quantities of santolin and thymol. Intestinal worms are extremely common in tropical regions, giving rise to disease and often to grave conditions.

Throughout our stay we have had for subsistence in the sick bay a large number of men for whom a special diet (soup, rice, eggs, etc.) was necessary. There have frequently been 20 sick or convalescent patients requiring such a diet. There is, it is true, a galley officially reserved for the service of the sick, but it is lacking in the more indispensable utensils; there is a grill or toaster, a range, and boilers, but no pots or saucepans. On ships on foreign stations, where the mortality is higher than in France and where the sick are only exceptionally sent to hospital (except at Saigon), it seems to be necessary to provide in the allowance table, ample material for galley uses.—(F. L. P.)

SURGERY.

Surgeons C. F. STOKES and RAYMOND SPEAR, U. S. Navy.

CULLEN, E. K., and DERGE, H. F. **The use of silver wire in opening the kidney.** Johns Hopkins Hospital Bulletin, November, 1909.

In a preliminary report several valuable facts have been deduced from experiments performed on the kidneys of living dogs. Attention is invited to the researches of Max Brodel on the blood supply of the kidney. As a rule, in man as in the dog, two main arterial trunks, anterior and posterior, from the renal arteries supply each kidney. The anterior, which is the larger, supplies considerably more of the kidney substance than the posterior. The arteries are likened to two trees with the branches pointing upward, so the passing

of a wire from the bottom upward would break fewer twigs than if it were passed in the other direction.

Two sets of experiments were performed: (1) Those in which the incisions were made in plane at right angles to the curved vertical axis of the kidney. (2) Those in which the kidney was split in a plane parallel with the sagittal plane of the kidney. In the experiments silver wire No. 3 or 4 was threaded on a Kousnielzoff-Cullen liver needle and passed through the kidney at the upper level of the pelvis. The capsule was then cut between the points of entrance and exit of the needle. It was found that if this was not done there was considerable hemorrhage from the capsule. As the wire was being drawn toward the surface it was very important to make firm counter traction.

All experiments showed that there was less traumatism to the kidney substance, less liability of infarct, and less hemorrhage when the kidney was opened by the silver-wire method than when the nephrotomy was performed with a knife.

In closing these wounds Harvey Cushing advises the use of superficial mattress sutures of fine black silk. It would be well, in our opinion, to reenforce this suture line by sewing over a flap of kidney fat, after the method advised by the Mayos, unless drainage were to be employed.—(R. S.)

THOMAS, WILLIAM S. Fractures of the radial shaft. Rotation deformity (occurrence and diagnosis) and aluminum plates. American Journal of Surgery, August, 1909.

Thomas in a study of 368 fractures of the forearm found the radius broken 86 times. Impaired rotation of the hand was a common sequel and was due to one or more of three factors:

1. Cross union where both radius and ulna are fractured at the same level.
2. Diminution of the interosseous space by approximation of the radius to the ulna.
3. Faulty rotation of the upper radial fragment upon the lower by muscular action.

The operation advised is exposure of the broken fragments without unnecessary traumatism; one aspect of the bone only is exposed, it not being necessary to free the broken ends, as is the case when sutures are employed.

The fragments are placed in accurate apposition, the small aluminum cleat is placed in position, small holes are drilled for the steel screws; the screws, varying from three-eighths to five-eighths of an inch, are then inserted. It is necessary to put at least two screws on one side of the cleat to prevent hinge motion.

Where operative interference is indicated to hold the fragments of a broken bone of the forearm together, this operation offers a simple and quick method of procedure. The periosteum is preserved, the traumatism is small, two factors that are very important in the proper regeneration of bone at the site of fracture without callus formation.—(R. S.)

FRY, H. D. An ovarian abscess containing a lumbricoid worm. Jour. A. M. A., September 25, 1909.

The patient was a colored girl, age 23, and presented symptoms of a double salpingitis with a tumor mass in the region of the left ovary.

At the operation an abscess of the left ovary ruptured, discharging 30 c. c. of pus. In the cavity was a small dead lumbricoid worm. The bacteriological findings were of interest, as *B. coli communis* was found in pure culture. No mention is made of a gonorrheal infection or what was the origin of the salpingitis on the right side.

In this case there were no intestinal adhesions to account for the passage of the worm through the gut wall. Fry is of the opinion that the worm found its way from the anus into the vagina, then by the left tube to the left ovary. The worm may have been placed directly into the vagina. No mention is made as to whether or not any worms were in the intestinal tract.—(R. S.)

DEAVER, J. B. Surgery of the stomach. Boston Medical and Surgical Journal. September 2, 1909.

Deaver in an address to the New Hampshire State Medical Society discussed modern surgery of the stomach. He pointed out the accessibility of the viscus and all the means at our disposal to outline its size, position, and the possibility of the presence of ulcers and carcinoma.

Attention was invited to the conclusion of the best surgeons that chemical findings of the stomach contents were purely negative.

Surgeons are called upon to treat distinctly functional diseases, the so-called neuroses, ulcers, and carcinomas of the stomach.

Surgical procedures in the class of neuroses are described as "vicious surgery" as a post-operative neurosis is added many times to the original neurosis.

The origin of gastric ulcers is discussed. Deaver states that his operations on post-operative observations lead him to believe that the hyperacidity is caused by the presence of the ulcer and not the ulcer by the hyperacidity. Mention is made of the toxemic origin. They

are probably due to some form of chronic infection, possibly auto-infection.

Deaver divides gastric ulcers into healed or healing ulcers and open ulcers. This division is a good one clinically and from a surgical point of view.

The classical signs and symptoms of ulcer are discussed. The absence of the cardinal symptom of vomiting has been noted in many cases. Vomiting in the diagnosis of a gastric ulcer is valuable only by the time of its occurrence and character of the vomitus. Hemorrhage, if we except gastric and œsophageal varices and cirrhosis of the liver, is the most definite symptom of a gastric ulcer, but the diagnosis should be made before this occurs many times.

Deaver points out that the Ewald-Leube method of starvation and liquid feeding has now been replaced by Lenhart's method of immediate feeding and rapid increase of diet. Both methods are unsatisfactory; only a very small percentage of cases recover permanently.

Deaver states that in cases of ulcer of recent duration medical treatment should be tried.

Gastro-enterostomy is the operation of choice. By this procedure the secretions of the stomach are changed to normal. The posterior no-loop operation as performed by the Mayos is the operation of choice. An anterior gastro-enterostomy supplemented by an entero-enterostomy is done when adhesions prevent the posterior operation.

In cases of hemorrhage surgical procedures are decided, as the mortality is much larger than in cases treated medically.

In cases of perforation there are three indications to meet. (1) An opening in the alimentary canal, (2) a diseased stomach, (3) peritonitis. The opening is to be closed by Lambert sutures reenforced by omentum. The diseased stomach should generally be treated by a gastro-enterostomy. The peritonitis is anticipated if not present by drainage, every case of perforated gastric ulcer should be drained. Deaver places a tube in the pelvis through a stab wound, the patient sits up in bed, all food is withheld for forty-eight hours, and enteroclysis by Murphy's method is used.

Hour-glass stomachs, due to ulcer, are best treated by resection, gastro-gastrostomy or gastroplasty in conjunction with gastro-enterostomy and not by a double gastro-enterostomy draining each pouch.

The production of pylorospasm and other gastric symptoms by gall stones and diseased appendices is also touched upon.

Gastro-enterostomy is advised in cases of dilated stomachs, when the muscle has lost its power and tone. When such stomachs are drained brilliant results usually follow. In gastropotosis, on the other hand, this or any operation is usually harmful.

Deaver advises repeated lavage of the stomach after operation, if there is persistent ether vomiting or if food collects. He states he prevents acute dilatations by such procedures.

The inability to diagnose carcinoma of the stomach is brought plainly before the profession. Mention is made of Moynihan's inaugural symptoms: If a patient is beyond middle life and has a previous history of gastric ulcer and we find him suffering with dyspepsia, associated with a loss of weight and a slight anæmia, we should suspect a malignant disease. The diagnosis should be made before a tumor can be felt. Gall stones, pancreatitis or duodenal ulcer may also give these symptoms, but as they, too, are all conditions that can be relieved by operation the abdomen should be explored early, for it is only by an early operation that we can hope to remove all of the carcinomatous tissue.

Deaver advises a gastrectomy of the involved portion of the stomach with a posterior or anterior gastro-enterostomy of all cases of carcinoma of the stomach if possible.

A valuable point now also being brought out by other leading surgeons is the relationship of carcinomas to ulcer. Deaver states that in two-thirds of the cases of gastric-carcinoma there has been an antecedent gastric ulcer. The method then by which we can best prevent the development of a carcinoma is to cure gastric ulcers by surgical procedures and so do away with carcinomatous endings. (R. S.)

GENERAL MEDICINE.

Surg. T. W. RICHARDS, U. S. Navy.

LAMBERT, ALEXANDER, M. D. **The obliteration of the craving for narcotics.** Jour. Am. Med. Assn., Sept. 25, 1909.

Past experience in the treatment of drug habitués has been so generally discouraging that the surprising results reported in this article, from such an authoritative source, appear to mark a great advance in the care of this most difficult class of patients. While Lambert is careful to point out that no claim is made of an infallible cure in all cases, he concludes that the desire for morphine, cocaine, or alcohol may be taken away "in less than five days with a minimum of discomfort and suffering to the patient." The danger of relapse lies in the fact that the patient may not *desire* a cure; weak and morally perverted perhaps, he retains the perilous knowledge that temporary relief from pain, anxiety, and distress may always be attained by a return to the drug. In the case of alcoholics—

it obliterates the craving and establishes the patient's self-confidence to go on without alcohol; it will do all that can be done for the man who honestly desires to be helped, but as sure as that man lives and just so long as he lives he can not touch alcohol in any form whatsoever without danger of a relapse.

The specific used in the treatment is as follows:

R	Gm.
Tincturæ belladonnæ (15 per cent)	62
Fluidextracti xanthoxyli.	
Fluidextracti hyoscyami	âa 31

Dosage: 6 to 8 minims every hour, increasing by 2 minims every six hours until 16 minims are being taken or symptoms of belladonna intoxication necessitate decrease or temporary withdrawal.

While this specific is being given, the most energetic cathartic medication is necessary; this is an essential feature of the method, and if not consistently carried out the treatment will fail. On the first and second days a certain amount of the customary narcotic is given, but none thereafter, and cardiac stimulants are usually advisable. Active treatment lasts about thirty hours, in most cases, and concludes in favorable cases with the passage of a liquid, greenish stool consisting largely of mucus and bile. An alcoholic, admitted during a spree or at the end of it, requires a preliminary hypnotic, the specific being generally deferred until he awakes naturally.

The treatment is described with much minuteness, the author insisting that a successful issue depends primarily upon a conscientious adherence to the details set forth.—(T. W. R.)

LAMBKIN, F. J., Col., R. A. M. C. The arylarsonate treatment of syphilis; its probable future effects in the services. Paper read in the Navy, Army, and Ambulance Section, British Medical Association, Dublin, July 29, 1909. *Lancet*, August 21, 1909.

In discussing the treatment of syphilis by means of the arylarsonates, the writer stated that it was not his intention to compare it with that of mercury, but simply to offer it as a substitute for cases in which mercury can not be given owing to extreme susceptibility, or which resist mercury. Since August, 1907, he had treated 130 cases by this method. Most of them did remarkably well.

The preparations used were as follows: (1) Atoxyl (arsonate of sodium), (2) soamin (amino-phenyl-arsonate), (3) arsacetin, and (4) arseno-phenyl-glycin (in vacuo). While the first of these, atoxyl, was used in 24 cases with much success, its unstable strength, the liability to decomposition of its solutions, and the report of its producing optic atrophy led to its abandonment.

The second preparation, soamin, is a stable product, but solutions for subcutaneous or intramuscular use must be made up fresh daily. This drug has been used very extensively, and, except in two cases, without toxic symptoms. The dose is 10 grains every second day until a total of 100 grains has been attained.

The third preparation, arsacetin, was introduced by Ehrlich as an improvement on atoxyl. The dose given is 15 minims of a 15 per cent

warm solution (representing 8 grains), every alternate day until 100 grains have been totaled. This drug has been used extensively without observing toxic symptoms. In the majority of cases it promptly removed symptoms and the patient's general condition was much improved, while in others it failed. The beneficial effects were most apparent in the older cases (late stages).

Of the newest preparation, arseno-phenyl-glycin, sufficient time has not elapsed to allow of a definite opinion being given. The fact of its requiring to be supplied in vacuo and the danger of breakage of the glass containers appears to the writer to limit its general use. For the present, the writer thinks the advantages are on the side of arsacetin. In some cases it has been given in combination with mercury with very good results, which leads him to the conviction that there are different strains of spirochætæ which are affected differently by mercury and arsenic.

Contra-indications.—For the present it is advisable to proceed cautiously with the employment of the arylarsonates, and to do so in those cases where no parenchymatous organic changes are observable, as it appears that diseased or enfeebled organs are more susceptible to their toxic action. Hence, cases showing signs of cardiac or renal organic disease should not be submitted to treatment by these salts.

Method of treatment.—The plan in vogue at present is to repeat the first course of treatment in three months' time (earlier in cases showing a recurrence), and a third course is given in six months in all cases, whether showing signs of the disease or not.

Prophylactic treatment.—At the meeting of the Medical Congress at Berlin, 1907, Metchnikoff made the statement that by injections of atoxyl he had succeeded in preventing further development of syphilis in cases of undoubted syphilitic chancre, and strongly advocated it as a prophylactic. His statement was very thoroughly tested in the British army. At certain of the larger military stations every second case of venereal sore of whatever description received injections of either atoxyl or soamin and a careful record kept. The experiment showed that the injections did not prevent further developments of disease in any way, so that from a prophylactic point their use must be considered a failure.

Effect on services.—What effect the arylarsonate treatment of syphilis will have on the services it is impossible to foretell, but that they are destined to supersede mercury is most unlikely. On the contrary, the writer believes that their introduction will strengthen more than ever the position of the latter, as by its combination with arylarsonates it will be feasible now to deal successfully with those cases which had hitherto for some reason or another resisted it when administered alone. There is a class of cases to which these arsenical compounds ought to be a veritable boon, i. e., those to which it is

impossible to give mercury in any form, owing in some cases to an idiosyncrasy, in others to the patient being debilitated and broken down from climate or other tropical influences, and especially to those cases of syphilis that are deeply tainted with malaria. On the whole, he believes that the introduction of the arylarsonates in the treatment of syphilis will have an important influence in the services, as they will undoubtedly tend to lessen the admission rate, as also that for invaliding. Our present knowledge of the power of these salts of arsenic over syphilis is only in a very elementary stage, but he looks forward to further experience of them and improved technique, leading us to that goal in the treatment of syphilis which has already been attained with dourine.

A short letter was read from Maj. H. C. French. R. A. M. C., in which he said that the test of benefit in early syphilis was the rapid reduction of induration in the chancre and in the lymphatic glands. He has not found soamin or arsacotin nearly so valuable for that purpose as mercurial inunction with baths.—(*Surg. F. L. Pleadwell.*)

HEYM, A., M. D. A new treatment of locomotor ataxia, based on a new theory of this disease. New York. Med. Jour., Oct. 30, 1909.

Accepting the syphilitic ætiology of tabes dorsalis, Heym considers that the destruction of nerve tissue results from toxins circulating not only in the blood but "in all the other fluids of the system," and particularly the cerebro-spinal fluid.

With this premise, he endeavored to neutralize these toxins by injection of a suitable agent into the subarachnoid space, sodium cacodylate being, so far, the substance employed.

Twelve cases of tabes and seven of "mental paralysis" have been treated in this manner, and beneficial effects "appeared promptly after the third or fourth injection in every case, with two exceptions."

Two cases of tabes are reported in detail, both showing marked improvement. It appears, however, that of nine patients who were atactic, this symptom was unchanged in six.—(T. W. R.)

HARDING, N. E., Capt. "Traitement À Vide" of enteric fever. Jour. Roy. Army Med. Corps, Vol. XIII, No. 4, Oct., 1909.

The writer gives us a disparaging analysis of recent optimistic reports upon the so-called "empty bowel" treatment of enteric fever (e. g., 3 pints of whey and a small quantity of chocolate daily) and to emphasize the importance of a larger series of cases quotes

the following instructive data showing the results attained by various other methods:

One unknown author treated 172 cases with 1 death by sulphuric acid; O. F. Paget treated more than 100 cases without a single death by means of olive oil in large quantities; Sir James Barr treated 55 consecutive cases in a tank with only 1 death; Thistle treated 100 consecutive cases by daily purging with calomel and salts, and only lost 2; Bushuyez has treated 318 cases with a mortality of 8.2 per cent, losing not a single case from hemorrhage, on a dietary including eggs, meat, chicken, and "milk pudding."

Captain Harding's own experience is all in favor of liberal feeding.—(T. W. R.)

HENSCHEN, S. E., Prof., Dr., Stockholm. *On the relation between alcoholism and tuberculosis.* Tuberculosis (monthly publication of the International Antituberculosis Association). September, 1909.

While this elaborate paper is based primarily upon the writer's own extensive investigations in Sweden, covering a series of years, he also reviews much of the literature from other continental centers.

His results accord with those of most other investigators in showing a close correlation between the incidence of alcoholism and tuberculosis, and also in accepting, as an established fact, an increased mortality among alcoholics. He considers, however, that the rôle of alcohol as a causative agent is an indirect one, in that it promotes unfavorable conditions in communities, not predisposition in individuals. "Alcohol provokes poverty, crowding, increased opportunity for infection, and consequently tuberculosis, which makes rapid progress in an alcoholized body."

The data have evidently been collected with unusual thoroughness and are presented with special care, but it may be doubted if the deductions therefrom will be fully acceptable to most authorities.—(T. W. R.)

DEEKS, W. E., M. A., M. D., and SHAW, W. F., M. D. *The treatment of amœbic dysentery.* Medical Record, Nov. 13, 1909.

In a series of 211 selected cases in the Ancon Hospital, Panama, the treatment found by far most effective consisted in rest in bed, a milk diet, and enormous doses of bismuth. Local amœbicidal irrigations are considered futile, as "it is impossible to reach the living, active, deep-seated amœbæ that are invading sound tissue in the walls of undermining ulcers," and "solutions which irritate the bowel only favor the invasion of fresh areas." Normal saline solution or plain water is therefore recommended, two to four times daily, simply to remove toxic discharges. Diet is of prime importance, an absolute milk diet being the best as intestinal putrefaction is then least marked. When

feeding becomes more liberal, main dependence should be on the carbohydrates, any undue increase in proteids being especially undesirable as promoting fermentation and putrefaction, or, in other words, merely furnishing "so much more pabulum for the bacteria in the large intestine, which in turn favor the growth of amœbæ." The only oral medication advised, after a preliminary dose of castor oil, is bismuth subnitrate, which is used in truly "heroic" doses, "three drachms every three hours" until there is general improvement. While the writers report no toxic effects, it would seem that such consequences might well be anticipated in occasional cases; if they arise immediate cecostomy is advocated.

One hundred and twenty-nine cases were treated by the above method with 24 deaths (18 per cent), but the 31 cases during the present year—the only period in which this method was rigidly adhered to—gave a mortality of only 6.5 per cent. These results appear more striking when compared with a mortality of 39 per cent in 82 cases treated by various other methods, among them being the administration of opiates, ipecac, and a combination of bismuth and opium, and irrigations with solution of quinine, thymol, silver nitrate, boric acid, copper sulphate, etc. Furthermore, there has not been a single relapse though some of the cases were very chronic. While more weight might be given this latter observation had the treatment been longer in vogue, it seems evident that results warrant the authors' optimism, especially in view of the irreconcilable opinions respectively held by advocates of the two most highly favored methods of to-day—the administration of ipecac and amœbecidal irrigations.—
(T. W. R.)

REPORTS AND LETTERS.

REPORT ON THE AMERICAN PUBLIC HEALTH ASSOCIATION.

By Surg. F. L. PLEADWELL, U. S. Navy.

In obedience to department's orders, dated October 13, 1909, I have the honor to state that I proceeded to Richmond, Va., for attendance upon the meeting of the American Public Health Association, October 19-22, as a delegate representing the Medical Corps of the Navy, and to report as follows:

There were about 200 medical men in attendance upon this meeting, emanating from Canada, United States, Mexico, and Cuba, and comprising representatives of the Army, Navy, Public Health and Marine-Hospital Service, as well as state registrars, members of state and municipal boards of health, and delegates from universities and educational institutions.

The meeting for the previous year was held at Winnipeg, Canada, and for the ensuing year will be held at Milwaukee, Wis.

The programme for this meeting included a total of some 127 papers, reports, and addresses, dealing with matters of sanitary and statistical interest and covering a wide field of scientific investigation and knowledge. In view of a division of these papers among three sections but a small proportion of those delivered could be heard by any one individual, and hence only a limited number can be referred to in this report.

The following abstracts indicate some of the more important papers delivered at this meeting:

Period of incubation of inoculation rabies. By B. L. Arms, M. D., Boston.

This paper gave the incubation period of inoculation rabies as observed from the last 157 positive guinea pigs met with in routine work. It showed the great variation in the incubation period, and therefore the necessity of keeping animals under observation for a long time. From this it must be seen that with such a variation in the incubation period in animals inoculated subdurally, how much greater a variation and longer period there must be in dogs or other animals bitten at a distance from the brain.

One case was mentioned in which a peritoneal inoculation was made, the pig dying on the one hundred and twenty-first day without previous symptoms; another case, in which the pig on the nineteenth day showed marked excite-

ment, was very gaunt, and stood in the peculiar attitude indicative of the early stages, proceeded to apparent recovery with freedom from all symptoms until the seventy-ninth day after inoculation, dying four days later.

	Days.
Average time to earliest symptoms.....	14. 84
From earliest symptoms to death.....	1. 69
From inoculation to death.....	16. 53

This is excluding the long cases; with those included the figures are, respectively, 17.73; 2.; 19.74.

Longevity of bacillus diphtheriae on swabs. By Francis H. Slack, B. L. Arms, and E. Marion Wade, of Boston.

This work was undertaken to ascertain how long swabs could safely be kept after being taken, before inoculating on serum, without vitiating the results.

Inoculations in each case were made on two tubes of serum, the swab itself being left in the second tube during incubation.

Smears were made in the usual manner, after fifteen hours' incubation of the cultures at 37° C., and stained with Loeffler's methylene blue.

Considering these cultures as for diagnosis the smears were then examined by each observer separately and their findings recorded.

An impartial comparison of these records was then made and a fair composite view of the whole work obtained.

These tests tend to prove that almost constantly *better results are obtained on swabs so kept up to the fourth day*, and that not only are many more positives obtained from these older swabs, but also better types of organisms and in purer cultures. Inoculations on the fifth day show fewer positives than those on the fourth, but rank almost equal to those of the third day.

The serum tubes in which the swabs were kept during incubation gave equally as good, or slightly better, results than the duplicates incubated without.

A modification of Hesse's medium for the differentiation of typhoid colonies in water and stools. By William Royal Stokes, M. D., and F. W. Hachtel, M. D., Baltimore, Md.

This paper showed that by the addition of 5 per cent glycerin to litmus-lactose agar in which only 7 gms. of agar is used that the typhoid colonies are not only large and concentric as described by Hesse and Jackson, but are also pink. This distinguishes them from such organisms as *B. alcaligenes*, *B. fluorescens*, *B. pyocyaneus*, and *B. proteus*.

The paper also described the results of using such a medium in the detection of the typhoid bacillus in a well producing an outbreak in a large institution, and in the stools of several carrier cases producing similar outbreaks.

Report of committee on standard method for the diagnosis of syphilis. By Herbert W. Williams, Buffalo, N. Y.

The recent extensive work, largely research in character, in the so-called "Wasserman reaction" has resulted in such rapid changes of method and improvements in technique that it is hardly wise in the opinion of this committee to consider, as yet, the formation of a method for the laboratory diagnosis of syphilis.

However, in view of the work of Noguchi and others in the simplification of the technique for performing this test, it appears to be altogether likely that in the near future all the radical improvements likely to be suggested for some time to come will have been made and a method capable of being utilized as a

routine procedure in public health laboratories will then be possible. There appears to be no question of the reliability of the Wasserman reaction, either in the acute, chronic, or latent stages.

The influence of age and temperature on the potency of diphtheria antitoxin.

By John F. Anderson, Washington, D. C.

The average yearly loss in potency of diphtheria antitoxin at room temperature is about 20 per cent; at 15° C., about 10 per cent; at 5° C., about 6 per cent, although in some instances these percentages may be much increased.

There appears to be little difference in the keeping qualities of untreated sera and sera concentrated by the Gibson process.

Diphtheria antitoxin to be placed upon the market and there kept under unknown conditions as regards temperature should not be labeled with a return date longer than two years and should contain an excess of at least 33 per cent to allow for decrease in potency; in addition, when serum is sold in syringes with an absorbable piston, an excess should be added for this loss.

Dried antitoxin kept in the dark at 5° C. retained its potency practically unimpaired for at least five and one-half years.

The lack of confidence in the therapeutic properties of old sera is without basis, as such sera, unit for unit, are as potent as new sera.

The protective value of diphtheria antitoxin is in exact accord with its unit value and is independent of the volume of the serum or other properties in the serum.

Report of the committee on standard methods of the bacteriological diagnosis of tuberculosis. By M. P. Ravenel, M. D., Madison, Wis.

The following examinations should be made: Sputum, urine, pus and other discharges, tissues; the first three of these should be routine matters in every laboratory, the last depending on the facilities of the laboratory.

The laboratory should supply outfits for the collection of sputum, with proper data blanks and directions.

The ordinary carbol fuchsin without a counter stain is recommended for general work. For decolorization 5 parts of nitric acid in 95 parts of 95 per cent alcohol should be used. Any of the mineral acids are allowable up to 10 per cent strength.

At least 10 bacilli should be found before considering any specimen positive. If this simple examination fails, digest with 2 per cent caustic potash, centrifuge, and examine sediment. Slides stained in cold carbol fuchsin for twenty-four hours will show bacilli when the more rapid heating method fails.

Urine should be centrifugated and the sediment washed in distilled water three times.

In the examination of all material, animal inoculation may be necessary for final diagnosis. This is especially important in cases of suspected genito-urinary tuberculosis.

Report of committee on standard methods for the bacterial diagnosis of glanders.

By W. L. Beebe, M. D., Minneapolis, Minn.

This committee did not wish to make a recommendation at this time for judging the mallein reaction, as at present there are only two active members on the committee.

Work that has been done on macroscopical agglutination shows that it is of much diagnostic value, but has not been tried sufficiently to recommend it as a routine procedure.

The Strauss method is of much value in diagnosing glanders where the horse has a high temperature, but this method is accurate in cases only when a positive diagnosis is made.

The need of quantitative methods in epidemiological work. By Charles V. Chapin, Providence, R. I.

This paper maintained that the progress of science is largely dependent upon the extent to which quantitative methods are employed. Such methods have been greatly neglected in sanitary science, but their application in some lines of work has been productive of notable results, as in the development of filtration, the production of the antitoxins, and the determination of the effect of food preservatives. On the other hand, such methods have been little used in the study of the life of pathogens outside of the body or of the dangers of air-borne disease or of the importance of carriers.

Health officers have neglected quantitative measurements even more than laboratory workers. Vital statistics, though supposed to represent actual measurements, are often misleading, owing to the unlikeness of the populations measured. The most serious neglect of the health officers has been failure to measure the relative importance of the different factors in the causation of disease and the cost of preventive measures in relation to their effectiveness.

Report of the committee on standard methods for the preparation of tuberculin and mallein. By V. A. Moore, M. D., Ithaca, N. Y.

The committee found that the various methods in vogue in the preparation of tuberculin differ considerably one from another in details, but that they all adhere to what seems to be the basic requirements for the preparation of a good material, and the products are of equal efficiency. The committee recommended, however, that there should be uniformity in the basic elements in the preparation of tuberculin, although the differences in the minor details do not seem to play a very important part in the quality of the product. Attention is called to the importance of using cultures that will produce tuberculin; that the culture should be grown for a sufficient length of time. The difficulties in the preparation of tuberculin hold for mallein.

NEW DEVICES.

A bacteriological thermostat; constant temperature maintained by a boiling liquid. By E. C. Howe.

The model was devised after the pattern of the "Victor Meyer thermostat," in which the temperature of an inner chamber was controlled by a surrounding jacket filled with the vapor of a given liquid for temperatures above that of the room. For 20° C. the liquid itself filled the jacket almost to the top. A return condenser, cooled with ice for the 20° liquid, prevented escape of liquid. With sufficient surface and low enough temperature a sealed condenser would produce the desired result with no possible loss of vapor. The apparatus has been tried to 80° C. for killing nonspore formers, using alcohol of proper strength to give the desired temperature, and at 61° C. as a vaccine killer, using methyl alcohol with a boiling point of 66° C., which gives the proper temperature with the radiation of this particular machine. At 20° C., using acetaldehyde, a temperature between 19.6° C. and 20° C. has been maintained for a week, the heat of the surroundings sufficing to boil the liquid.

A new mailing outfit for sending bile, specimens of blood, feces, and urine through the mails, with the results of such cultures made for physicians in a state and municipal laboratory. By William Royal Stokes, M. D., and H. W. Stoner, M. D., Baltimore, Md.

This paper described a mailing outfit, consisting of a double tin mailing case legalized by the Post-Office Department, in which specimens of blood, urine, and feces can be sent for detection of the typhoid bacillus itself, both as a diagnostic procedure and as a method of detecting carrier cases. It also described a simpler case which can be used in municipal work and which can be sent to the laboratory by a messenger. The paper also gave the percentage of positive results obtained from blood, urine, and stools, both as regards the typhoid bacillus and such rarer types in blood as the colon bacillus and the bacillus pyocyaneus. The laboratory methods were also described in detail.

An incubator heated and controlled by electricity. By Edward Bartow, Ph. D., and Frank Bachman, of Urbana, Ill.

Because of the cost of the double-walled water-jacketed incubator in common use, also because of the inconvenience of heating these incubators by electricity, ordinary refrigerators have been substituted in the laboratories of the Illinois state water survey. For a 20° incubator a fish box with a hinged top is used, and for a 37.5° incubator an ordinary vertical refrigerator with three doors opening to the front is used. In order to obtain a temperature lower than 20°, pipes were placed around the inside of the fish box, through which a stream of water could be allowed to flow. This will lower the temperature to 16° C. In order to raise the temperature to the required 20° electric heat is used. First, shaded electric light bulbs were tried. Later heating coils were used. For a thermostat strips of metal and hard rubber fastened together with a double contact at the vibrating end are used. For a thermoregulator there is used an instrument devised by the Bateman, Garrison, Maddox Company, of Champaign, Ill. This is so arranged that the controlling current is shut off except when needed to turn the current on or off.

For the 37.5° incubator heating coils were placed in the lower compartment and a thermostat similar to the one in the 20° in the middle compartment. For a thermoregulator a Sechrist switch is so modified that the regulating current will pass through it only when in use for turning the current on or off. A shunt circuit for the heating line is used in regulating. Both incubators give a temperature varying less than 1°, as shown by the maximum and minimum thermometer placed in each incubator. The cost of installation in proportion to the capacity of the incubators is very much less than the cost of the water-jacketed incubators.

AIR ANALYSIS.

Report of the committee on standard methods for the examination of air.

During the year most of the promising methods have been carefully examined by one or more members of this committee, and those which seem best suited for practical use were submitted to the section. Physiological tests have not yet progressed far enough to allow the fixing of standards for the exact degree of heat, moisture, dust, etc., which can be permitted in rooms of various types.

The most important properties of air from the sanitary standpoint are physical, rather than chemical or bacteriological. Much attention has therefore been given to temperature, humidity, dust, and light. For temperature recording thermometers are recommended, and for humidity the sling psychrometer of the United States Weather Bureau type. For ordinary dust determinations

Atken's koniscope is suggested as standard, while for measuring the large quantities of dust in factory air a filter method is recommended. Action on photosensitive paper seems most promising for recording data in regard to lighting.

Under chemical determinations of CO_2 , the committee recommends the Pettersson apparatus as modified by Sonden for accurate scientific work, requiring an accuracy of one-tenth per 10,000; for ordinary sanitary work, however, the Cohen and Appleyard method is suggested as standard.

For quantitative determination of the number of bacteria in air the committee has worked out the details of a standard sand filtration method. Studies have also been made in regard to possible qualitative tests for specific mouth bacteria, but with negative results.

Bacteriological methods for air analysis. By John Weinzirl, Ph. D., Seattle, Wash.

The three general methods of bacteriological analysis of air, viz: (a) Filtration through sand, etc.; (b) bubbling through water, etc.; (c) precipitation by gravity; all can be made to give satisfactory quantitative results. For ease in manipulation, convenience in making numerous field tests, and cheapness of construction, the sand-filtration method possesses decided advantages. The filters can be constructed in any laboratory at a trifling cost, large numbers can be made ready for field trips, and the danger from accidents is slight. Greater accuracy is possible than by the bubbling method. The effectiveness of the sand filter may be increased by the addition of one-fourth part of powdered silica. With the sand-silica filter the results are generally accurate within 1 per cent.

Endeavors to find a soluble filter which is accurate and the material of which exerts no inhibitive action, proved a failure.

An aspirator of the continuous type makes field determinations relatively easy.

Preliminary notes on the determination of CO_2 in air by electrical conductivity. By E. C. Howe.

The resistances of a 0.005 M. solution of barium hydrate and of one, two, and three fold dilutions were measured at a definite temperature (25°C.) and the curve plotted. A series of analyses of air were then made by shaking 10 cc. of the 0.005 M. hydrate with 500 cc. of air for ten minutes, noting the temperature and pressure, and measuring the resistance of the hydrate after the precipitation of the barium carbonate at 25°C.

By using a hard glass, glass stoppered bottle results were obtained consistent among themselves with a maximum deviation in six consecutive tests of 0.04 parts per 10,000. No experiments with artificial mixtures and no comparison with other methods were made. The presence of other gases that are ions in solution with the hydrate vitiate the results. A portable form of the apparatus is under construction, which it is hoped will prove to be a practical carbon dioxide tester.

WATER ANALYSIS.

A comparative study of fecal streptococci from the horse, the cow, and the man. By C. E. A. Winslow and G. T. Palmer, Boston, Mass.

Recent work by English bacteriologists has thrown much light on the relationship of the streptococci, and indicates that these organisms may prove of special value in water analysis as criteria for differentiating fecal pollution

from different animals. The findings of these bacteriologists that the streptococcus of the horse can be distinguished from those of human origin by its failure to acidify lactose media, and that those from the cow produced acid from lactose have been confirmed by the present writers.

The commonest streptococci in human feces are *S. mitis* (acidifying dextrose and lactose) and *S. fecalis* (dextrose, lactose, and mannite). In the cow *S. fecalis* is rarer, but its place is taken by *S. salivarius* (dextrose, lactose, and raffinose) and *S. equinus* (dextrose alone). *S. fecalis* is not very abundant even in human feces, however, nor is *S. salivarius* in bovine feces. In general the bovine and human feces are similar. In the feces of the horse, on the other hand, practically all the streptococci are of the *S. equinus* type. Only 4 out of 100 strains produced acidity in any other medium than dextrose broth. This is a practical point of considerable importance which ought to make it possible to distinguish road washings, mainly polluted with horse droppings, from sewage pollution of other sorts. A test for lactose fermenting streptococci which could be made by inoculating lactose broth, incubating for several days, and then plating on lactose agar, should, if positive, show human or bovine rather than equine pollution.

A bio-chemical reaction for detecting pollution in water supplies. By Andrew Watson Sellards and Edward Bartow.

The experiments described were based on the supposition that water inoculated into nutrient broth causes changes to take place in the media which depend on the bacterial character of the inoculated samples, and has no relation to the original chemical character of the water itself. Several species of bacteria were added to nutrient broth, and the variation in the free ammonia and nitrite content of the broth were noted. The experiments indicated that the ammonia was not an accurate index of the presence of the intestinal group of bacteria. The nitrite determination, on the other hand, showed complete removal of the nitrites present in the original media by bacteria of the colon group. It is evidently not accompanied by the formation of ammonia to any considerable extent, as the bacteria which remove nitrites do not cause a notable increase in the ammonia content. A comparison of the nitrite test with the ordinary methods of water analysis was made. In 131 routine analyses there were 21 indeterminate determinations by the glucose-broth method and no indeterminate results by the nitrite media determination. In 61 per cent of the cases there was agreement in the two methods, in 15 per cent disagreement, besides the 16 indeterminate. The method requires but little time, space, or material, and is apparently well adapted to routine work. Further tests are being made with this method.

Bile lactose media in water examination. By Josephine S. Pratt and William H. Park, New York.

Numerous comparative tests by inoculating Croton and other fairly pure surface waters into bile lactose and peptone solution lactose media have shown but little difference in results. Both of these have proven superior to glucose peptone solution.

When gas production has occurred in the bile lactose solution, colon bacilli have actually been obtained, but in certain waters the reverse has been true. The testing for the Voges reaction and the keeping of nutrient gelatin cultures for one month to observe liquefaction reveal that a considerable proportion of supposed colon bacilli are of some other variety.

The intestinal bacteria in the feces of over 100 men, cows, and horses have been tested. In all but one of the samples the bacilli obtained gave the characteristics of colon bacilli.

In this case only the bacilli gave the Voges reaction.

Studies on inhibition, attenuation, and rejuvenation of B. coli. By Frank E. Hale and Thomas W. Melia, Brooklyn, N. Y.

There has been much discussion and uncertainty as to the delicacy and relative value of dextrose broth and lactose bile in testing waters of fairly pure quality. The present investigation was undertaken with a view to throwing light upon the subject.

Comparisons have been made between plain broth, dextrose broth, lactose broth, lactose bile, and other liquid media under greatly varying conditions, artificial and natural.

The conclusions reached are as follows:

1. Rejuvenation in plain broth followed by transplanting into lactose bile sometimes indicates the presence of *B. coli* two dilutions higher (by tenths) than lactose bile alone, especially when the *B. coli* is attenuated.

2. After such rejuvenation, transplanting into lactose bile is as delicate as transplanting into dextrose broth when *B. coli* is present.

3. Dextrose broth made with Liebig's extract averages one dilution higher than lactose bile in a gas formation.

4. Dextrose broth made with fresh-meat infusion is as delicate an indicator for gas formers as is rejuvenation in plain broth followed by transplanting.

5. In testing for *B. coli* specifically, transplanting must be made from dextrose broth into lactose bile to give proper presumptive evidence of *B. coli*.

6. Gas formations in lactose bile, after transplanting from the plain broth or dextrose broth, is not always certain, even when *B. coli* is present, on account of interfering growths in the original medium.

7. Lactose bile gives more reliable presumptive tests for *B. coli* than any other medium.

8. Other species of bacteria cause much less interference with the gas formation of *B. coli* in lactose bile than in other media.

9. The bile salts of lactose bile do cause an appreciable degree of inhibition in the development of *B. coli*.

10. This inhibition increases with attenuation.

11. To rejuvenate and transplant seems too laborious and uncertain in routine work. The information gained assists more especially in interpreting the results obtained with lactose bile. Lactose bile makes a distinction between recent and distant contamination, hence gives better evidence of the actual relative sanitary quality of a water.

Pancreatin bile salt medium for the detection of B. Coli in water. By Luther R. Sawin, Mount Kisco, N. Y.

The desideratum of the water analyst is to obtain a medium which by its selective action shall inhibit the growth of all but sewage bacteria. As the colon bacillus is the normal inhabitant of the intestine of man and many of the lower animals, it is considered a typical fecal organism, and its presence in water is regarded as an index of contamination. The problem is, therefore, to obtain a medium which shall be both accurate and rapid for the detection of *B. coli*.

A medium which has so far given very satisfactory results is made up as follows: Water, 1,000 c. c.; peptone, 10 gm.; beef extract, 7.5 gm.; gelatin, 5

gm.; sodium glycocholate, 2 gm.; pancreatin, 1 gm. The pancreatin increases the gas production.

Surface waters of known sanitary quality were tested with dextrose broth, lactose bile, and this medium, and the following conclusions deduced:

The pancreatin bile salt medium when inoculated with sewages or polluted waters yielded results which generally checked those obtained with lactose bile and seemed to agree with known contaminated conditions. But with water of good quality the results obtained by the use of the different media disagreed, gave frequent anomalies, and, on the whole, seemed questionable.

Liver broth; a medium for the determination of gas-forming bacteria in water and sewage. By D. D. Jackson and T. C. Muer, Brooklyn, N. Y.

The determination of gas-forming bacteria in water and sewage by means of lactose bile gives results which represent the relative degree of contamination of dangerous or recent origin. While of especial value in judging the degrees of pollution present, it does not show the presence of gas formers other than *B. coli*, and does not often indicate *B. coli* in an attenuated state.

For those observers who desire to determine the presence of all gas formers and *B. coli* to the highest degree to which it is actually present, the authors have devised a medium giving quicker and higher results than dextrose broth, even after rejuvenation in nutrient broth. Its composition is as follows:

	Grams.
Fresh beef liver.....	500
Peptose.....	10
Peptone.....	10
Water.....	1,000

This medium is prepared in the following manner:

Chop fresh beef liver into fine pieces, mix it with twice its weight of water and allow it to simmer one hour in a double boiler with occasional stirring.

Strain through a coarse strainer, add 1 per cent of peptone, boil for one hour in a double boiler.

Neutralize with sodium hydrate, using phenol-phthalein as an indicator, and add 1 per cent of dextrose.

Boil over a free flame for five minutes, make up loss by evaporation, filter through flannel or absorbent cotton, tube and sterilize.

In the examination of water dilutions of 0.1, 1.0, and 10 c. c. of the sample may be inoculated into lactose bile and another series into liver broth.

Positive tests in the lactose bile indicate the degree of pollution with *B. coli*.

Gas formation in the liver broth indicates the degree of contamination with gas-forming bacteria, both attenuated and virulent.

Transplanting within eighteen hours from the liver broth into a second set of lactose bile tubes gives a fairly accurate idea of the amount of attenuated *B. coli* present. Negative results in both sets of bile tubes and positive results in the liver broth usually show that the gas-producing bacteria present are not *B. coli*.

The determination of the number of leucocytes in milk by a direct method. By S. C. Prescott and R. S. Reed, Boston, Mass.

The method in general use for determining the number of leucocytes present in milk are all based on the use of the centrifuge. The assumption is that all but a small fraction of the leucocytes are precipitated, and also that this

fraction is a fairly constant proportion of the whole and can be safely neglected. An investigation carried on in the Boston Biochemical Laboratory during the past summer has shown both of these assumptions to be incorrect. By the use of a new method, it has been found that the distribution of the leucocytes in a given sample of milk, after centrifuging, varies greatly in different samples of milk, although their distribution is approximately the same in different samples of the same milk. Usually more than half are present in the cream, one-fourth or less in the precipitated slime, and the remainder in the skim milk.

The variation in position of leucocytes in different samples is apparently due to the variable percentages of cream present. The distribution of the leucocytes in a centrifuged sample corresponds closely to the previously known distribution of bacteria in similar samples.

The new method by which these facts have been ascertained is as follows: A measured drop (0.01 c. c.) of milk to be examined is spread evenly over a measured area (1 sq. cm.) on a glass slide, dried with gentle heat, the fat dissolved out with xylol, the slide again dried and stained with methylene blue. The number of leucocytes present is then determined by examination with the microscope. Results done in duplicate show a small percentage variation, proving the practical error is not a large one.

A series of tests of milk show that much larger numbers of leucocytes are normally present in milk than has been supposed. The average number of leucocytes present in samples examined is approximately 1,500,000 per c. c., while numbers less than 100,000 per c. c. are uncommon.

Preliminary report of committee on methods of chemical milk analysis. By J. O. Jordan, Boston, Mass.

Milk solids: Evaporate 5 gms. milk over boiling water in flat-bottomed dish for two hours; cool and weigh.

Mineral matter: Ignite above residue at red heat to white ash; cool and weigh.

Determination of fat: Babcock method.

Milk sugar: (a) Optical method: Polarization of filtrate obtained by action of mercuric nitrate solution or of mercurous iodide solution upon milk. (b) Gravimetric method: Place 25 gms. milk in a 250 c. c. flask, add 0.5 c. c. 30 per cent acetic acid; shake. Allow to stand for a few minutes, add about 100 c. c. boiling water; shake; add 25 c. c. alumina cream; shake and set aside for ten minutes. Filter through a wetted ribbon filter, use wash water and make filtrate and washings up to 250 c. c. Act on this reducing sugar solution with copper sulphate solution and alkaline tartrate solution, and from the weight of the resulting cuprous oxide determine the amount of lactose present from tables of Munson and Walker, page 243, Bulletin 107, revised, Bureau of Chemistry, U. S. Dept. of Agriculture.

Graduated glassware: Indorsement of standard adopted by Association of Official Agricultural Chemists, recommended. The committee suggests the advisability of having the neck of the Babcock bottle of such diameter that a volume of 2 c. c. shall not occupy more than 70 millimeters or less than 55 millimeters.

Consideration of the subject of lactometers with a view to adopting a standard was suggested.

"I. Dangerous trades or dangerous processes vs. II. Unhygienic conditions due to the disregard of proper hygienic precautions." By William C. Hanson, M. D., Massachusetts State Board of Health.

I. Discrimination should be made between dangerous trades and dangerous processes.

1. An occupation may be dangerous. Every, or nearly every, process or department may involve danger to employees. The danger may be (a) largely avoidable, (b) to a certain extent avoidable, or (c) unavoidable.

2. An occupation may be dangerous, the danger being inherent in the industry, and yet the most direct and obvious effects upon the health of the workers may be confined to a few of the processes or departments.

II. Discrimination should be made between conditions inherent in an industry and those that are not indispensable to it.

Unhygienic conditions may be found not only in trades which are dangerous, or trades having one or more processes which involve danger to health, but in occupations that can not be so classified. In other words, unhygienic conditions may not be indispensable to the industry.

By calling to the attention of the public the avoidable dangers connected with the cotton processes with the same degree of emphasis that has for years been put upon the dust problem, which, from the nature of the industry, always will be to a certain extent unavoidable, much more good may be accomplished, for in this way all, or nearly all, of the avoidable objectionable conditions may be eliminated, and the exact danger caused by the cotton dust in the several processes can then be more accurately judged.

With the most approved processes of manufacture, employees in the pearl industry are always subjected to a certain amount of dust, which, being a non-metallic mineral dust, not only irritates the throat and trachea, causing one to cough and clear the throat by expelling mucus with dust, but may, over a period of years, extend its action to the lungs and give rise to shortness of breath and other symptoms of dust-diseased lungs, or of tubercular complication. For this reason it is none too radical a step to bring such pressure to bear upon the manufacturer of mother-of-pearl goods as will prevent the employment of boys or girls under 18 years of age.

In some instances there is no doubt that both employer and employee are ignorant of the danger arising from the inefficient removal of dust generated in the process of polishing iron, steel, brass, copper, etc., and to the emery and cotton dust from polishing and buffing wheels. On the other hand, in many cases the workmen themselves are largely responsible, by their lack of appreciation of, and even opposition to, properly equipped machines, which, of course, furnishes to the employer justification for not operating dust-removing devices which he has installed, perhaps at a big expense.

In the section devoted to vital statistics, a number of papers dealing with mortality, morbidity, and birth statistics by State and municipalities were presented, and your representative read a paper before this section on "The characteristics of naval vital statistics."

In the section dealing with municipal health affairs, papers were read on the subjects of milk supply, school inspection, disposal of wastes, and miscellaneous papers presented on methods of controlling infectious disease, improvement of civic hygiene, organization of health department, histories of typhoid outbreaks, etc.

REPORT ON THE SIXTEENTH INTERNATIONAL CONGRESS OF MEDICINE.

Buda-Pesth, August-September, 1909.

By Medical Director JOHN C. WISE, U. S. Navy.

This congress met on the 28th of August and adjourned on the 4th of September, to meet four years later at London.

The work of this body is divided into twenty-one sections, the twentieth being devoted to "sanitary, military, and maritime services," the twenty-first to "naval and tropical medicine."

Inasmuch as the communication presented by the delegate for the navy, "The hospital ship as a component of the fleet" came under the cognizance of the former, it will be spoken of first, but it must be premised that it is a difficult duty for a delegate to divide his attendance on any two sections, inasmuch as the sections meeting in different buildings a great part of the time is lost in coming and going from one to the other.

If the work of the twentieth section of this congress is an example of the usual routine of this body, it can not be considered of much value to the naval service; for, with one exception, of the twenty-four formal reports to this body that of the delegate of the United States Navy alone dealt with the problems which confront the officers of such services. The exception was the report of Bruyn Kops, of the naval service of Holland, entitled "Influence des detonations sur l'ouïe des canoniers," this being read by title. The question of "prepared dressings" was very generally discussed. As our own service had decided on this subject, through the "joint army and navy medical board," which, after a careful investigation of the dressings in use by nearly all the services of the world, adopted the first-aid package now in use, and the "shell wound dressing" recommended by Surgeon Stokes, of the United States Navy, this matter did not appeal particularly to our representatives, as from an investigation of all dressings presented none seemed at all superior, if equal to, those in use by the United States military and naval services. Upon a resolution of Surgeon-General Imbriaco, of the Italian army, a committee was appointed with a view of adopting an "international prepared dressing for use in all armies." This seemed neither practicable nor desirable, for it is quite evident that with the rapid improvement in such dressings and the frequent changes therein that an "international" entente on this subject will be not only difficult, but practically impossible.

A report by Major General Sforza, of the Italian army, on "Tuberculose dans l'Armée," was one full of interest and constituted one of the best expressions on this matter, both from a statistical and general standpoint. Though addressed to a large audience, 95 per cent of whom were of the army, the report on "The hospital ship as a component of the fleet," presented by the delegate for the United States

Navy, was given a most attentive hearing, and elicited considerable discussion.

Owing to the fact that a very small percentage of the audience understood English, this paper was presented in French. A résumé of the paper is as follows:

General review of present opinion and facts as to the care of the wounded in naval engagements.

All the personnel of a ship in action is on the firing line, and is exposed to greater danger than would be a force in an engagement on land, in that the enemy's fire is concentrated, or focal, and the agencies for destruction are greatly increased.

Inasmuch as the personnel of a ship in action is on the firing line, the activities of the medical department must to a great degree correspond to what would be done in continental operations under the same circumstances. The removal of the wounded depends upon the rate of casualties; surgical assistance is emergent, and there is no logical place for protected hospitals on ships of war.

The requirements for space sufficient for modern surgical methods can no longer be supplied in ships of war. Mobilization for immediate and emergent cases alone is possible, all other cases being evacuated as quickly as possible into the hospital ship.

Though the hospital ship, from its equipment, can be utilized either as a base hospital or transport operating with a fleet in time of war, it is the analogue of the field hospital in the army.

In the twenty-first section, in the discussion of the prophylaxis of yellow fever, Doctor Agramonte, the Cuban delegate, severely arraigned the methods of quarantine and prophylaxis in vogue in the Gulf ports of the United States, claiming that the methods as practiced in Cuba were much superior and more effective.

Reports of interest were made on "The etiology and prophylaxis of bacillary dysentery," "The plague in India," "The prophylaxis of cholera," but a discussion of these subjects is too extensive for the purpose of this report.

I beg to submit herewith a communication of Doctor Doyen, of Paris, including his communication to sections 5 and 7 of the congress. In the former (section for therapeutics) this able writer discusses the "Polyvalent action of mycalosine against the majority of infectious diseases of man, and of pamphagine against the greater part of the infectious diseases of animals," and "The different methods destined to combat cancer."

In concluding this report, it can be stated that the delegate for the navy considered it a part of his duty, so far as was possible in this immense body, to meet and exchange views in regard to the status of medicine at home and abroad. Without assuming any responsibility for the views expressed, it may be stated that the impression prevailed that the superior academic equipment required as a preliminary to the study of medicine abroad gave the foreigner a decided advantage over the American in matters relating to internal medi-

cine; on the other hand, the American conception of and success in aseptic surgery was much above that of Europe.

REPORT ON THE CAMP OF INSTRUCTION, ANTIETAM, MD., 1909.

By Surg. M. S. ELLIOTT, U. S. Navy.

In obedience to the department's order of July 31, 1909, I proceeded on that date to the camp of instruction of medical officers of the National Guard, under the command of the medical department of the United States Army, at Antietam, Md., and have the honor to report as follows:

The camp was located on the battlefield of Antietam just north of Bloody Lane and about 1 mile from the village of Sharpsburg. The site was an excellent one, located in a dry sloping field, and all requirements of a well-selected site were met. The camp consisted of a field-hospital section, fully equipped with a detail of 45 men, and an ambulance company, fully equipped with a detail of 67 men. Both of these organizations were under the command of their regular officers. The camp was under the command of Maj. F. P. Reynolds, M. C., U. S. Army. The following officers were specially detailed as lecturers and instructors: Lieut. Col. W. D. McCaw, M. C., U. S. Army; Maj. Paul E. Straub, M. C., U. S. Army; Maj. Charles R. Reynolds, M. C., U. S. Army. In addition, the officers in command of the ambulance company and field hospital lectured and gave instruction.

The course of instruction was divided into two classes, the first beginning on July 15 and the second on July 27. The course ended on August 11.

The total number of medical officers of the National Guard attending the course was 68, and 19 of the Eastern States were represented. The rank of the officers varied from lieutenant-colonel to that of lieutenant.

The following schedule gives the daily routine of instruction:

Hospital corps drill and first aid, Captain Paterson, daily, except Saturday and Sunday, at 7.30 a. m.

Military hygiene, Lieutenant-Colonel McCaw, four days a week at 8.15 a. m.

The Medical Corps in campaign, Major Straub, four days a week at 9 a. m. Practical field work, 1 to 4 p. m. daily, with one whole day in field work.

Lectures on practical medical administration of troops in the field, Maj. C. R. Reynolds, four days a week at 4 p. m.

The instruction was made as practical as possible, and every opportunity was taken to impress the principal facts by demonstrations of the actual conditions in the camp and in the field.

The field hospital and camp was not supposed to be an ideal one, but one equipped for active field service and one that the medical officers of the National Guard would meet in service with the Regular Army.

A regular camp routine was carried out and the daily administration of the field hospital was utilized in the instruction. The student officers stood regular day's duty as officer of the day.

The day's work began at 7.30 a. m. with a hospital corps drill and first aid, by the ambulance company under the command of Captain Paterson. At a spare time during the afternoon Captain Paterson drilled the student officers in the hospital corps drill.

At 8.15 a. m. Lieutenant-Colonel McCaw lectured on military hygiene. All the practical points of sanitation in the field were touched upon, especial stress being laid on the duties of medical officers in the prevention of disease, selection of camp sites, care and purification of water, food, exercise, and length of marches, personal hygiene of the soldier, importance of policing of camps and regular and systematic inspections by the medical officer, the disposal of waste, prevention of flies, actual demonstration of the McCall incinerator, rock-pile crematory, and the Darnell filter, all of which were in daily use in the camp.

At 9 a. m. Major Straub lectured on the Medical Corps in campaign. The subjects brought out in Major Straub's lectures and his practical demonstrations and instruction in the field, of the work of the Medical Corps in relation to and cooperation with the different organizations of an army, are of great importance and practical use to the medical officers of the National Guard. He laid great stress upon the fact that the medical officer was no longer simply a dispenser of drugs, but a sanitary expert and a sanitary tactician; that the Medical Corps must not only meet the requirements and emergencies of its profession, but that its organization should be military.

Briefly stated the following subjects were lectured on and whenever possible practical demonstrations were given:

Duties of the medical officers in the field and in battle; cooperation of the whole army; knowledge of the general campaign by the chief surgeon and the division surgeons; the formulation by the division surgeon of the section in the battle order relative to location of dressing stations, field hospital, and transportation of wounded to the base; copies of the order to be sent to commanding officers of the field hospital, regimental and brigade surgeons, so as to have concerted action of the whole medical department; importance of medical department being military in every sense. Great stress was laid on the importance of medical officers being able to read maps, in relation to locating aid stations, dressing stations, and field hospitals in protected spots, always keeping in view the accessibility of these stations both from the front and to the rear; the importance of knowledge of statistics in past wars in computing amount of supplies; accommodations for care and transportation of wounded; percentage of wounded to be expected in modern wars; location of aid stations, dressing

stations and work of each; aid station must not be established too soon; should keep in touch until line is actively engaged, and be established by regimental personnel. Rules to be followed in fixing aid station: Near line of engagement as can find good protection; accessibility from front and to the rear; near water and wood. No fixed rules could be made, as the location of the stations would depend on type of engagement and terrane. The use of ambulances in the field; time to traverse certain distances; number of wounded can be carried. Location of dressing stations, by ambulance companies, must be as near line of battle as can find protection, be accessible from front and rear, near water and wood, and if possible should be combined with aid station. "Bring dressing station to wounded rather than wounded to dressing station." Both may be within "danger zone;" often necessary to cross line of fire to reach dressing station. Importance of dressing all wounded. "It is better that the wounded be captured with wounds dressed than left on the field." Unavoidable neglect of wounded during civil war caused much criticism of medical department. Percentage of wounded who will have to be transported; about 50 per cent of wounded under modern conditions will be able to walk to aid stations and dressing stations.

The importance of the establishment of a "collecting station for the slightly wounded," was brought out; estimated that 15 per cent of all wounded will be able to march at least a day's march. The slightly wounded give much trouble and take up time and space which should be allotted to the more serious cases. All these cases should be diverted to this station, which should be far enough to the rear to be well protected and accessible. The work done at this station will be first aid and food. These wounded can march to the rear following line of evacuation.

Major Straub gave the following data in regard to wounded:

One out of every 5 die; 10 per cent of wounded are nontransportable, dressed on the field and left alone; 40 per cent of total number require transportation; 24 per cent in sitting position and 16 per cent recumbent; 35 per cent will walk to dressing station; 15 per cent will walk to field hospital or farther. It takes a loaded litter one and a half hours to go 1 mile and return. An ambulance can transport 4 wounded recumbent and 1 sitting one half mile and return in thirty minutes.

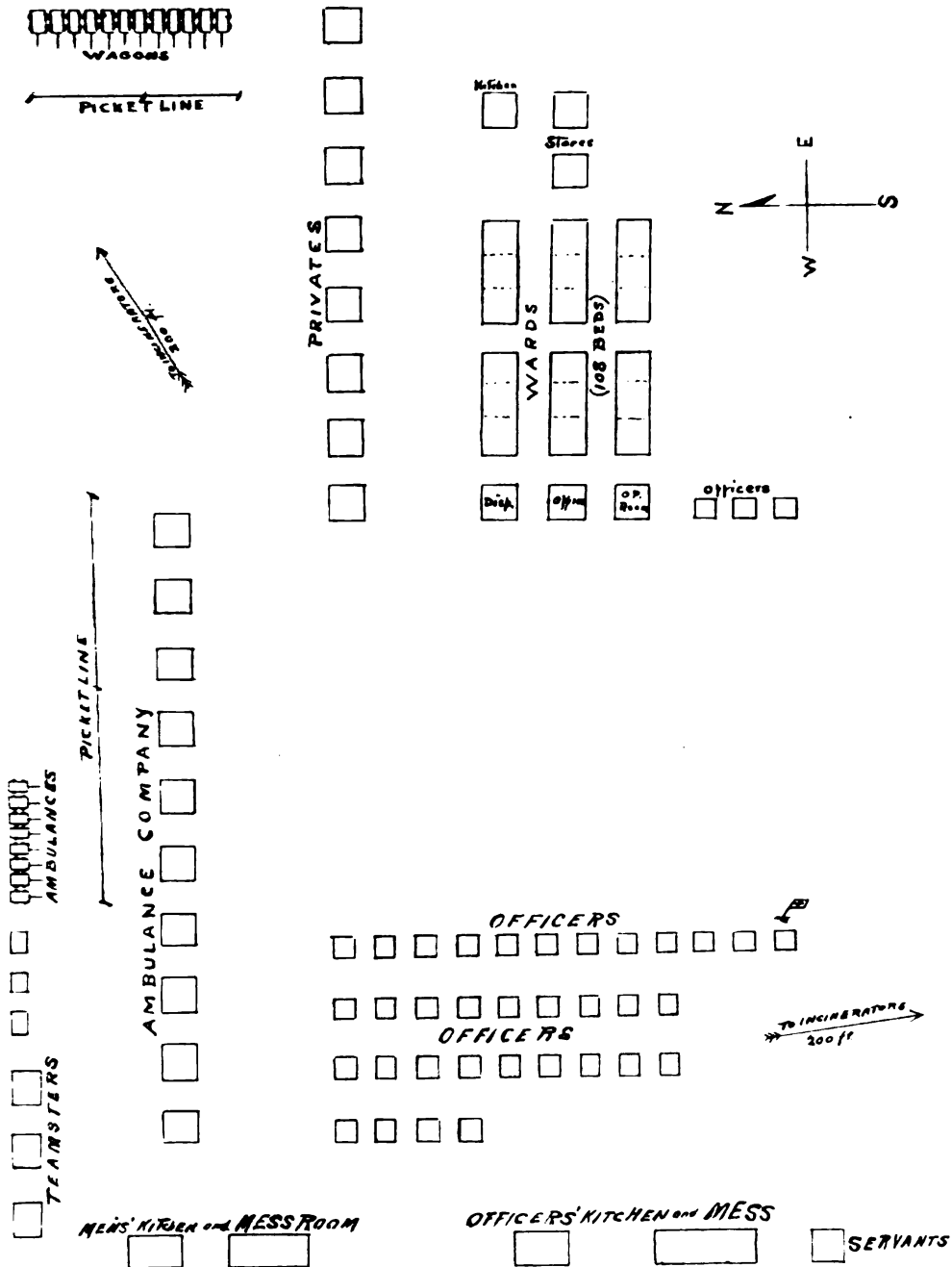
The above average statistics were brought out to impress and familiarize the officers with the importance of knowing what to expect in active operation and to make the necessary preparation for the care and transportation of wounded.

The character of the work done at the aid station, the collecting station for slightly wounded, and the field hospital was emphasized. The transportation of the wounded to the base, use of empty transport wagons and railroads were also mentioned. The practical field work, under Major Straub, consisted of instruction in map reading and locating aid stations, dressing stations, and field hospitals. A number of horses were provided, and every day from 1 to 4 p. m. was taken up in this work.

One entire day was devoted to a battle problem, with an imaginary line of battle and establishment of aid stations, dressing stations, and field hospital. The officers were detailed to establish these stations, utilizing their maps.

A section of the field hospital was transported several miles from the camp and pitched in a well-selected spot, the different parties

CAMP of INSTRUCTION ANTIETAM, MD



were then sent out to establish the aid and dressing stations, putting into actual practice the information imparted in the lectures.

The area of operation covered several miles and was worked out entirely from the field maps. After the days' work was completed the location of the various stations were criticised by Major Straub.

Maj. Charles R. Reynolds lectured daily at 10 a. m. on field equipment, subsistence, rations, important paper work which the officers of the national guard should be familiar with in the field and the various forms and returns.

Maj. Frederick P. Reynolds lectured on the subject of the organization of the medical department.

The time spent at the camp by the student officers was fully occupied, and the life led was that of active operations.

The student officers evinced great interest in the instructions; they familiarized themselves with the daily administration of the field hospital, ambulance company, and the camp as a whole.

The sanitation of the camp was excellent; all water for drinking purposes was filtered through the Darnell filter; four sections of the McCall incinerator were in use, two for the officers and two for the men; all garbage was burnt on a rock pile incinerator. All cooking for officers and men was done with the regular field equipment and was all that could be desired. A plan of the camp is attached.

The annual establishment of such camps of instruction by the Regular Army would go far to prepare the medical officers of the national guard for cooperation with the army in time of war. Every man who has attended such a course has just about doubled his value to the Government.

While the instructions imparted at the camp were primarily for the use of an army and on a large scale, it would be of much value to the naval medical officer, especially in his duties ashore, and I respectfully recommend that in the future medical officers be detailed to attend these courses.

In conclusion, I wish to express my thanks for the courtesy extended to me by all the officers connected with the camp of instruction. Much credit must be given the Medical Corps of the Army for the projection of such camps and for the great interest shown in the work, and now that the experiment has proven such a success it is to be hoped that the camps will become annual events. As one officer stated to me, "I have learned more here in one day than in years with the guard."

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NO. 2

VOL. 4

UNITED STATES NAVAL MEDICAL BULLETIN

FOR THE
INFORMATION OF THE MEDICAL
DEPARTMENT OF THE SERVICE

LIMITED TO PROFESSIONAL MATTERS AS OBSERVED BY MEDICAL
OFFICERS AT STATIONS AND ON BOARD SHIPS IN EVERY
PART OF THE WORLD, AND PERTAINING TO THE PHYS-
ICAL WELFARE OF THE NAVAL PERSONNEL

APRIL, 1910

(ISSUED QUARTERLY)



WASHINGTON
GOVERNMENT PRINTING OFFICE
1910

NAVY DEPARTMENT,
Washington, March 20, 1907.

This United States Naval Medical Bulletin is published by direction of the department for the timely information of the Medical and Hospital Corps of the Navy.

TRUMAN H. NEWBERRY,
Acting Secretary.

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PREFACE.

The publication and issue of a quarterly bulletin by the Bureau of Medicine and Surgery contemplates the timely distribution of such information as is deemed of value to the medical officers and the hospital corps in the performance of their duties, and with the ultimate object that both shall continue to advance in proficiency in respect to all of their responsibilities.

It is proposed that the Naval Medical Bulletin shall embody matters relating to hygiene, tropical and preventive medicine, pathology, laboratory suggestions, chemistry and pharmacy, advanced therapeutics, surgery, medical department organization for battle, and all other matters of more or less professional interest and importance under the conditions peculiar to the service and pertaining to the physical welfare of the naval personnel.

It is believed that the corps as a whole should profit, to the good of the service, out of the experience and observations of the individual. There are many excellent special reports and notes beyond the scope of my annual report being sent in from stations and ships, and by communicating the information they contain (either in their entirety or in part, as extracts) throughout the service, not only will they be employed to some purposes as merited, but all medical officers will thus be brought into closer professional intercourse and be offered a means to keep abreast of the times.

Special attention will be given by the instructors of the Naval Medical School to the review of advances in medical science of special professional interest to the service, as published in foreign and home journals, and extracts from these will appear in the bulletin, together with such remarks as the instructors may deem of value to officers on foreign service or sea duty.

Information received from all sources will be used, and the Bureau extends an invitation to medical officers to prepare and forward, with a view to publication, matter on subjects relating to the profession in any of its allied branches.

C. F. STOKES,
Surgeon-General, U. S. Navy.

(v)

SPECIAL ARTICLES.

THE COMMISSARY DEPARTMENT IN NAVAL HOSPITALS.

By Medical Director P. A. LOVERING, U. S. Navy.

During my service in different naval hospitals I have always felt the unsatisfactory condition of the commissary department, and I have been led to write this article in the hope that it may aid in correcting the defects and placing it on a more satisfactory basis. The term commissary department I shall use to embrace everything which pertains to the feeding of the personnel of the hospital.

During my recent service at the Norfolk hospital the deficiencies of the present system were constantly realized, and much difficulty was experienced in obtaining even moderately successful results. I think that my difficulties were not due to inexperience in being called upon to handle a new task, for I was quite familiar with the management of naval hospitals, as I had been executive surgeon of the Brooklyn hospital and later in command of the Canacao hospital. I soon found that while my past experience was valuable and helpful, I had to encounter a greater and more difficult task than I had met before. The difficulties I encountered were partly due to the larger personnel subsisted and to the great changes in the dietary, but mainly to the unskilled staff of employees.

The increased number to be subsisted.—At Brooklyn the personnel was rarely more than 125, at Canacao the average number was about 75, but in Norfolk it was 250, and it often reached 300 and even more during the prevalence of the epidemics which occurred every winter.

The character of the personnel subsisted has changed materially and also the dietary.—A few years ago, even in the larger hospitals, the patients, nursing staff, and civilian employees were mostly fully developed adults accustomed to the simpler fare of the last generation. At the present time the personnel at a naval hospital is composed almost entirely of young adults still in the adolescent stage of their lives, and who require a more liberal diet than older men do. The elements which form the personnel are much more varied than a few years ago, embracing, beside the average workingman, many of considerable training and education who fill the higher-paid positions of the enlisted force and among the civilian employees. In a

naval hospital it is at present not practicable to have separate dietaries for the different grades or classes among the personnel, but a single dietary must be drawn up that will be adapted for all the patients and staff, from the colored messmen and laborers to the female nurses.

It must be considered, too, that the standard of living has improved very much among all classes of men. On a ship the "hard-tack and salt horse" form an unimportant part of the ration, and on shore the diet of the average man has improved very much in the last fifteen years. The ration now issued in the navy is varied and liberal, comparing very favorably with that of the workingman in our large cities, and is more generous, particularly in the amount of meat, than that used by the people in the country communities. As the dietary has improved so greatly in the navy on board of ships, it is inevitable that at least an equal advance should be made in the naval hospitals, and this has been recognized by the large increase in the articles now obtained on the yearly contracts. The construction of a liberal and varied dietary is not difficult from the larger variety of food now available, and should be readily handled by any experienced medical officers. I found it convenient and satisfactory to have a bill of fare submitted to me on Sunday for the meals of the coming week, and I could readily make such changes as I thought fit to prevent extravagance and monotony.

Difficulties arising from defects in the present force of men employed in the commissary department.—I believe that the most difficult problem in the successful management of this department of a naval hospital is not in the large increase in the personnel nor in the construction of a suitable dietary, but in the preparation and serving of the food, and this problem is most difficult of solution under the present conditions which prevail in the commissary staff. I will first state the difficulties which I encountered and then suggest what I consider to be the best remedy for the existing evils.

The permanent staff of civilian employees in the kitchens and mess rooms at the Norfolk hospital includes nine men—two cooks and a scullion in the kitchen, three attendants in the mess room, and three in the dish-washing room. When the contagious camp is occupied an additional cook is employed in the camp kitchen, where in the spring of 1909 food was prepared for as high as 168 people, including patients and attendants. At Norfolk all the cooks and mess attendants were colored, and it was impossible to secure white labor, although repeated efforts were made to hire it.

The pay was not sufficient to attract skilled men, the hours were long—over twelve every day—the work hard, and there was little opportunity for relief or vacation. In consequence of the few attractions these positions offered it was necessary to employ men of little

experience, drawn from the cheaper restaurants and hotels. The men did not have the experience or knowledge required to fit them for the cooking which should be required in a large modern hospital, so that the service rendered by them was generally indifferent and often bad. When, as occasionally occurred, a man began to be useful and conversant with his duties he was quite sure to leave if a more attractive situation offered. It occurred repeatedly that the kitchen was left with but a single and inexperienced man to prepare the food for 250 persons. Under the present system of employing men there seems to be no remedy for the inefficiency of these employees and no means of preventing them from leaving at any time. From the meager and inefficient kitchen staff there inevitably resulted poor cooking, waste, and dirt. I believe that 20 per cent more food was purchased for the hospital than would have been required if the kitchen staff had been efficient, and if such had been the case all would have fared better.

This estimate closely agrees with that given by Medical Inspector Gatewood in his work on Naval Hygiene when discussing the ration of the men on a ship. It is also well known that in the Army and Marine Corps, where the cost of the ration is considerably less than in the Navy, that there is a large saving in the ration and that at many posts the money obtained from this saving amounts to a considerable sum.

After the food has been cooked, well or poorly, the next step is to serve it quickly and in a palatable form. About 75 per cent of the personnel take their meals in the mess rooms, near the kitchen, and the meals for the remainder, including sick officers, bed patients, and female nurses, have to be carried to all parts of the hospital. With a personnel varying between 250 and 275, about 200 are fed in the mess rooms and 75 elsewhere. While the food for this number is mainly prepared in the main kitchen, the serving of it is done by the nursing staff, who take the food on the diet carriages and carry it to the wards and patients' rooms.

In this article I shall confine myself to the question of serving the food to those who eat in the general mess rooms, comprising about 75 per cent of the whole personnel, including those patients who were able to leave the wards, the members of the hospital corps, the marine guard, and the civilian employees.

At Norfolk the number eating in the mess rooms averaged about 200, although this number was often exceeded. There were but three mess attendants to look out for the mess rooms, keep them clean, set the tables, bring the food from the kitchen, and clean up after meals. It was manifestly impossible to expect satisfactory service from so small a number of untrained messmen, about 1 waiter to 60 persons

fed, and that, too, when it is remembered that a second table has to be set for those on watch at the regular meal hour.

An attempt was made to supplement the deficiency of the kitchen and mess room staff by detailing patients to assist. The result was not particularly successful, as the permanent staff was colored, and it is not generally practicable in the South to get young white men to work harmoniously with negroes. The young apprentices look upon this work as rather beneath them, for on a ship it is now almost entirely performed by a separate body of men. As a result of the insufficient force of attendants the food was cold when served, and the mess rooms were not kept as clean as was desired.

The class of men willing to fill the position of mess attendants is very indifferent, as the hours are long, the work hard, and the pay moderate. Such men require constant supervision, and under the present system there is no one available for this duty. The men never stayed long, went and came almost as they pleased, and it frequently happened that after pay day one or two failed to show up the next morning.

After the food has been eaten the dishes are carried to the dish-washing room to be cleaned for the next meal. Here the work was quite satisfactory on the whole and due mainly, I think, to the excellent equipment. The dish-washing machines did their work quickly and well.

A very important division of the commissary department of a hospital has charge of the reception, storage, and issue of the supplies, including, besides the food, many other articles—as china, soap, brooms, in fact everything used in the hospital except the medical supplies and fuel.

Owing to the recent changes in the method of furnishing supplies, the quantity of the articles that has to be kept in store has greatly increased. Until July, 1908, all these articles were obtained on contracts made with three or four local dealers. Now the number of contractors has more than doubled, as all the articles furnished to the ships can now be drawn by the hospital. Many articles are also now drawn from the general storekeeper, and all the canned goods are supplied by still another set of contractors. It was then the custom to draw daily from the contractors the supplies required, and very little was carried in store. Now very many articles have to be drawn in large amounts, and I remember that a few months before I left Norfolk a single shipment of 957 cases of canned goods was unexpectedly received from the supply depot. Where two years ago the value of these articles in store did not exceed \$200 or \$300 it now amounts to as many thousands. This naturally has increased the work and responsibility of the storekeeper, who has to receive and store all supplies, issue them when needed, and to estimate daily the

amount of perishable supplies which will be required for the next twenty-four hours. He has also general supervision of the kitchen and mess rooms, and personally issues all articles, as milk, ice, eggs, for different parts of the hospital and other supplies for the whole hospital. These duties are most comprehensive and require a man of intelligence and honesty, who is willing to work from early morning until after supper. The importance of this position can hardly be exaggerated, for upon the man who fills it depends in great measure the proper feeding of the personnel and the prevention of waste.

With the large variety of food now available there is a constant tendency to order articles which are unnecessary and the usual components of the dietary in extravagant quantities. Nurses and even medical officers are equally prone to extravagance. The cost of the daily ration is often too high. In Norfolk the ration cost 42 cents a day; this included ice as well as domestic supplies, such as soap, brooms, lye, floor wax, and the like, costing about $1\frac{1}{2}$ cents a day, and which, with the possible exception of the ice, should not be included in the cost of the ration. With an average personnel subsisted of 250 persons this amounts to over \$100 a day and nearly \$40,000 a year. I think this is too much, and I believe that with a trained man at the head of the commissary department the daily cost of the ration should not exceed 40 cents at present prices of food. The system which I adopted at Norfolk, and which I think was as good as any which could be devised under the present system, was to place the hospital steward, on duty in my office as writer, in charge of this department. He calculated every day the quantity of perishable food that would be needed the next twenty-four hours and prepared the daily orders for my signature.

He was present when the stores were received, and superintended the weighing. To him also were given the special diet orders prepared by the medical officers in charge of the wards, and it was his duty to see that the cooks were instructed to prepare what was ordered. He was assisted by a hospital apprentice, who was in charge of the storeroom and issued the stores to the kitchen and wards. This plan worked fairly well, but there was a constant tendency toward extravagance in the purchase of unnecessary articles and too large quantities of certain supplies, as meat, milk, and eggs. I was fortunate in having for two years the same hospital steward in charge of this department, but he labored under the great disadvantage of being unable to give his whole time to this work, as he was busy all day long in the office, and also did most of the photographic work in the X-ray room. If he had been able to devote himself entirely to commissary work I feel quite certain that he would have accomplished much more. In an institution where more than 250 persons are subsisted there should certainly be one man of intelli-

gence and sobriety whose sole duty should be the commissariat work. From my experience in naval hospitals, the causes that make it so difficult to obtain satisfactory results in the commissary department may be briefly enumerated as:

First. The difficulty of obtaining a competent staff.

Second. Uncertain tenure of service, causing frequent changes of employees.

Third. Insufficient force and meager pay.

Under the present system of depending upon civilian employees, who are often incompetent and constantly changing, it is not probable that there will be much improvement in the conditions that now exist, and it is altogether likely that the commissary department will continue to be one of the least satisfactory divisions of the hospital. Only a few years ago a similar condition existed in the wards of the hospital. There were no nurses whom to-day we should consider as trained and competent men to perform the work which is constantly demanded of them. I remember that during my service at the New York hospital, with often 100 patients, there were but three poorly paid men to do all the nursing, and not one of them was a trained man who could prepare a patient for an operation or even sterilize the dressings. We all know how this wretched condition was remedied by the establishment of an enlisted hospital corps and very recently by the addition of a female nurse corps. I believe that the only way in which the present unsatisfactory state of the commissary department can be materially improved is by the establishment of a similar corps of men enlisted and trained for this purpose.

The hospital commissary corps, for so I will style it for convenience, should consist of the three classes of stewards, cooks, and mess attendants.

The steward class should include commissary stewards and commissary apprentices.

The cooks should comprise chief cooks, cooks (first class), and cooks.

The commissary stewards should receive and issue all supplies except the medical stores, and make out the daily requisitions for all perishable food for the approval and signature of the commanding officer. The kitchens and mess rooms are under the direct control of the commissary steward, who sees that they are kept clean, the food properly cooked and served, and all waste checked. The commissary steward should keep careful records of all stores received and expended. This part of his duties has increased very much, now that stores are sent to hospitals in large quantities. A six months' supply of canned goods is now sent at one delivery, and at the larger hospitals this amounts to several hundred cases.

A commissary steward should be sent to every hospital, and where the patients average more than 50 a commissary apprentice should also be detailed; the latter's services will certainly be required in the larger hospitals, and there is no way by which he can be better trained for the duties of commissary steward.

The duties of the cooks are sufficiently designated by their title. They should prepare all the food, except certain articles of the special diet, which I think had better be intrusted to the female nurses, and which can be readily prepared in the well-equipped diet kitchens which have been placed in the hospitals. In the larger hospitals it is advisable to detail one of the regular cooks for the preparation of such special diets as are cooked in the main kitchen.

To every hospital there should be sent a chief cook and a cook, and where the average number subsisted reaches 100 there should also be a cook (first class), making three in all, and I think this number would be sufficient until the daily number subsisted materially exceeds 150, when an additional cook should be given.

In the larger hospitals, subsisting 200 or more, I would advise four cooks—one chief cook, one cook (first class), and two cooks. One of the cooks will always be available for the contagious wards. At Norfolk, where these wards are well separated from the hospital, there are separate kitchen, storerooms, and mess room. All the food for the contagious cases and the nursing staff is prepared there, and in April, 1909, the number fed in this way reached 168, including the men of the hospital corps, and for many weeks ranged between 125 and 150. It would have been impracticable to feed this number from the main kitchen, as the food could not be carried, in good condition, so far, and it would have been impossible to maintain an effective quarantine and prevent the spread of disease.

Although perhaps not included in the field which I am endeavoring to cover in this article, I think it is well to emphasize here the absolute necessity of having at all of our hospitals separate wards provided for the eruptive fevers and other acute contagious diseases. These wards should have a kitchen and all the necessary appurtenances of storeroom, mess room, and the like, so that they may be independent in every respect. The danger of contagion is thus minimized and the food of the patients can be better prepared and served. Every year at the approach of cool weather measles, mumps, scarlet fever, and other contagious diseases appear and persist until summer. This is especially true when the hospital is located near a training station, where the recruits are constantly bringing fresh cases of contagious disease.

Mess attendants.—These men include those who serve in the mess rooms, dish-washing room, and scullion in the kitchen. One should be detailed for every 30 of the personnel fed.

In the Norfolk hospital, with a personnel of 250, according to the scheme I have proposed, there would be detailed as a permanent staff: Commissary steward and commissary apprentice, chief cook, cook first class, two cooks, eight mess attendants (four of the latter for mess rooms, three for dish-washing room, one for scullion in kitchen). The total force in the commissary department would be 14, and I think that this is as small a number as should be allowed.

For the training of these men a school should be established in one of the larger cities, preferably New York or Philadelphia, for at these places men could be more readily recruited. At this school the commissary stewards and apprentices should receive instruction in the inspection and care of food and the keeping of the necessary records. They should also be taught the principles of cooking, as they are to superintend the kitchen and cooks. Even a moderate knowledge of cooking will aid them in the management of the kitchen, and very much also in estimating the amount of food required and in preventing waste.

Cooks should receive instruction at the same school for so long as may be necessary. It would seem to me that the course of instruction should not be long. The chief cooks and cooks first class should be at least moderately proficient when enlisted, and should soon be ready for the work at the hospitals. The men who enlist as cooks of the lower grades will probably be quite ignorant, and I think it would be well for them to serve at a hospital for at least three months under the supervision of experienced cooks to determine their general fitness for the work and if it is desirable to send them to the cooking school.

The cooking school should be attached to one of the large hospitals and under command of the medical officer, but the general management of the school and particularly the supervision of the instruction in the preparation of food, I think, might well be given to a member of the female nurse corps. The commissary stewards should receive instruction at the hospital in the inspection of supplies, in their proper storage and issue, in keeping the necessary records, the preparation of requisitions, and the construction or drawing up of suitable menus.

I have only roughly outlined the general plan of the cooking school and the subjects to be taught. If at any time such a school is started, it will be wise to examine similar courses, both in government and civil institutions, and carefully draw up a comprehensive scheme.

Mess attendants can be sufficiently taught at the naval hospitals, and would require no further course of instruction.

The medical commissary corps I have proposed might be provisionally planned to consist of 300 men divided into 25 commissary

stewards, 25 commissary apprentices, 25 chief cooks, 25 cooks first class, 50 cooks, and 150 mess attendants.

The corps should serve only in hospitals at home and abroad and on hospital ships.

The monthly pay of the commissary branch should be at least equal to that of similar positions on board of ships, and the following rates are suggested:

Commissary stewards	\$60	Cook, first class	\$40
Commissary apprentices	30	Cooks	30
Chief cook	55	Mess attendants	16 to 24

The number I have proposed at first sight might appear large, but it is to be remembered that there are in commission or construction naval hospitals at Portsmouth, Boston, Newport, New York, Philadelphia, Annapolis, Washington (two), Norfolk, Pensacola, Great Lakes, Las Animas, Puget Sound, Mare Island, Yokohama, and Canacao, and probably there will soon also be hospitals at Guam, Baguio, Olongapo, Honolulu, and Charleston.

The hospital ship also will require as many men as a large hospital.

The plan I have proposed is to be considered as merely an outline or suggestion and will undoubtedly require many changes. At first it might be best to train up some of the present hospital apprentices for the position of commissary steward. I have in mind a young man at the Norfolk hospital who was detailed for this duty and showed so much aptitude for the work that with moderate training I believe he would make an excellent commissary steward. I have no doubt that there are similar men at the other hospitals. It certainly would be a great advantage to recruit this corps in part at least from those who already have considerable acquaintance with the daily life and working of a hospital.

I believe the establishment of a permanent commissary corps is the best method of remedying the evils and deficiencies of the present system, which has never been satisfactory, and with the increase of the navy and the consequent enlargement of the hospitals has become more and more inadequate.

THE PRESENCE OF THE LEPRA BACILLUS IN THE CIRCULATING BLOOD.

(A preliminary report.^a)

By Asst. Surg. G. B. CROW, U. S. Navy.

The diagnosis of leprosy is sometimes difficult. This has been especially true here because of the presence of the disease locally known as "gangosa," which in some cases presents lesions not unlike the trophic changes occurring in leprosy.

^a Dated November 20, 1909, and received for publication January 13, 1910.

After satisfying myself of the diagnostic value of Rosenberger's method of demonstrating the tubercle bacillus in the circulating blood, I began an examination of the blood of the patients in the leper colony here in Guam.

The technique used is practically that of Rosenberger, and is as follows: With a syringe, like that used in blood-culture work, about 10 c. c. of blood is drawn from a superficial vein of the arm, care being taken to avoid diseased areas of the skin. This is at once emptied into a sterile tube containing 5 to 10 c. c. of 2 per cent sodium citrate in normal salt solution; the tube is inverted a few times, plugged with cotton, and is then set in the ice box for sedimentation. Some of the sediment, and preferably the upper, or leucocyte, layer, is drawn up with a pipette and rather thick smears made on new, clean slides. The slides are dried with moderate heat and then placed in distilled water. In five to fifteen minutes the red cells will dissolve, leaving a thin "ground glass" layer of leucocytes. (If too great heat has been used in drying the film, the hæmoglobin does not readily dissolve, and the slide is not satisfactory. If sodium carbonate becomes mixed with the blood as an ingredient of the normal salt solution, or from being used in sterilizing the syringe, the leucocyte film will not adhere to the slide.) The slide is then dried, fixed, and stained. So far, a 5 per cent solution of sulphuric acid has given best results as a decolorizing agent. The degree to which the acid stain is retained varies; even in a given slide, some bacilli may be deep red, others pink.

Sixteen cases have been examined. In fifteen the blood contained a bacillus which morphologically and in staining reactions is identical with the lepra bacillus. In some cases only a few were found and then only after prolonged search; in other cases they were quite numerous. They occurred singly and in groups with varying frequency, and did not appear within leucocytes as often as did the tubercle bacillus. Many were beaded. In almost every case some of the organisms, but not all, showed the long, slender, spindle-shaped outline characteristic of those found in the nasal discharges and in leprous nodules. The negative case shows clinical evidence of the disease.

Of course, tuberculosis must be excluded; I have not seen spindle-shaped bacilli in the blood of tubercular cases, and none of the cases examined show any symptoms of tuberculosis. In three cases glycerin agar slants were inoculated by spreading three or four drops of the sediment over the surface of the media, and these showed no growth at the end of two weeks. Guinea-pig inoculations will be made as soon as the animals are available. A later report will cover the remainder of the cases in this colony.

PRELIMINARY REPORT OF THE FINDING OF HOOKWORM IN AMERICAN SAMOA.

By Passed Asst. Surg. P. S. ROSSITER, U. S. Navy.

I have the honor to make the following preliminary report^a upon the presence and prevalence of the hookworm, *Necator americanus*, among the population of Tutuila, Samoa:

On November 21, 1909, I found large numbers of hookworm ova in the feces of a man whose appearance and symptoms suggested that he might harbor that parasite. Two days later, following the administration of thymol, thousands of adult hookworms, identified as *Necator americanus*, were recovered from the stools; numbers varying from a few dozen to thousands have since been recovered from the stools of this and other cases.

Systematic examination of feces was at once begun to determine what proportion of the population harbored this parasite, with the following results to date:

Of the members of the Fita Fita guard examined, 18.7 per cent were found infected; and of a large number of civilians, 66.6 per cent.

The first percentage is doubtless too low for an average of the population, for these men live under infinitely better sanitary conditions than the other natives. The second percentage is probably too high, for some of this number were selected cases.

From investigation to date, I estimate that 40 to 50 per cent of the population harbor the parasite in greater or less numbers, and that of this number 5 per cent have severe infections.

On December 2, 1909, a report was made to the governor of the presence of this parasite in the island, and measures for its eradication were recommended.

A board, appointed by the governor, consisting of three officers, including the senior medical officer, and the secretary of native affairs, is now at work upon recommendations for the carrying out of these measures.

Although no opportunity has as yet been offered for examining any natives except those of American Samoa, yet from the wide distribution of this parasite in Tutuila, and the frequent and intimate intercourse between this and other islands of the Samoan group, I feel justified in predicting the early detection of its presence throughout the Samoan Islands at least.

^a Dated December 7, 1909, and received for publication January 14, 1910.

THE PREVENTION OF VENEREAL DISEASES IN THE NAVY.

By Surg. RAYMOND SPEAR, U. S. NAVY.

More men are disabled and rendered useless for duty in the navy by gonorrhea, chancroids, and syphilis than by any other class of disease.

Most cases of venereal infection can be prevented by:

- (1) Proper instruction of the enlisted personnel in the immediate causes of these infections and the exact manner in which these diseases are transferred from one person to another.
- (2) The use of protectors during exposure.
- (3) The administration of preventive treatment on the return from liberty to all men who have exposed themselves to infection.
- (4) Circumcision of all men who have long or tight foreskins.

Many of the younger members of the enlisted force of the navy have absolutely no idea of the causes of venereal diseases nor do they understand the exact manner in which they become infected; many of them appear to think venereal diseases choose their victims irrespective of any risks they may run individually. Such simple precautions as urinating and washing after exposure are often neglected. If the men understand why they should urinate and by so doing they wash the gonococci out of the urethra and if they understand that it is possible to wash off the causative agents of syphilis and chancroids by means of soap and water and some antiseptic they will be armed with knowledge that is invaluable and will usually employ these means of lessening the chance of infection of their own volition.

In most seaports of the world it is a well-known fact that a large percentage of the prostitutes are diseased, and they care little how far and wide they spread their own misfortunes. So advice to the sailors along these lines will usually tend to make them a little cautious.

Every means should be taken to lessen the chance of infection in a crew. The names of all men that need to be circumcised should be taken as soon as they report on board a ship and as opportunity presents itself these men can be attended to. Many a man has torn a bruised or tight foreskin and infected himself with syphilis, where if he had been circumcised no tearing or bruising of the parts would have occurred, and he would have escaped the initial inoculation.

The golden moments for preventing the development of venereal cases on board a ship are directly after the return of the men from liberty. It is then, if the men have not been away longer than forty-eight hours, that most can be done for them.

In 1905, while the U. S. S. *Baltimore* was on the Asiatic station, preventive treatment was given the men after their return from

liberty, with the result that although the ship visited the ports of Sidney, Melbourne, and Auckland for a month each, there were practically no venereal cases on board, and the crew was "clean." This happy state of affairs was brought about by an intelligent commanding officer who aided the medical officer in all his recommendations. The English ships which were in these ports at the same time as the *Baltimore*, in most cases, had over 25 per cent of their crews infected with some sort of venereal disease, so the nonexistence of venereal disease on the *Baltimore* was due to the preventive treatment entirely.

The few cases that did develop were in men who had overstayed their liberty or neglected to take the preventive treatment. One case of syphilis developed in a man who had reported at the sick bay for precautionary measures. The initial lesion was not, however, on his penis, but was on his abdomen. This case is instructive in showing that probably the man escaped having a chancre on his penis by the application of calomel ointment, but at a point where he probably scratched himself and did not apply calomel ointment a chancre developed.

On the *Baltimore* a copy of the liberty list was sent to the sick bay, all men returning from liberty reported at the sick bay and were there checked off. If a man was under the influence of liquor he was sent to the sick bay in charge of a messenger. If a man reported that he had exposed himself to infection he took the preventive treatment as follows:

1. Washed the glans penis with a solution of bichloride of mercury 1-2,000 by means of a cotton sponge.
2. Took an urethral injection of 2 per cent protargol, and held it in for from thirty seconds to a minute.
3. Rubbed 50 per cent calomel ointment (made up with one-fourth lanoline and three-fourths vaseline or lard) well into glans penis, foreskin, and shank of penis. Abrasions were not cauterized.

The initial washing was instituted for the purpose of removing dirt and secretions that the men had had no opportunity of removing while on shore. It is surprising in how filthy a condition some men will return to the ship, especially when they have been drinking.

The injection of protargol seemed to destroy all gonococci in the urethra if the injection was taken even as late as forty-eight hours after exposure. Several other silver salts would probably be equally efficacious.

To Metchnikoff belongs the credit of demonstrating the value of calomel ointment in preventing the development of syphilis after inoculation. His experiments on monkeys and on students are well known. The explanation of the fact that calomel ointment will prevent the development of syphilis is probably that the treponema

remains localized in the lymphatics of the penis for a certain length of time and is destroyed by the calomel, which is absorbed through the same channels, so it is better not to cauterize and seal a doorway where an infective agent has entered, but preferable to keep it open and follow along with a substance which destroys the offender.

It is at present too early to predict the value of atoxyl on board ship as a means to combat the development of syphilis. Just as we inject an antitoxin for the prevention of tetanus, we might inject atoxyl or an antitoxin for syphilis as a precautionary measure in men who present "tears" or "chafes" on the penis after a suspicious exposure. On board a battle ship or a large cruiser, where liberty parties contain from 200 to 250 men, the problem of giving to each individual personal attention seems at first a large one. Actual experience on the U. S. S. *Rhode Island*, however, has shown that even with the limited facilities on board it is perfectly feasible.

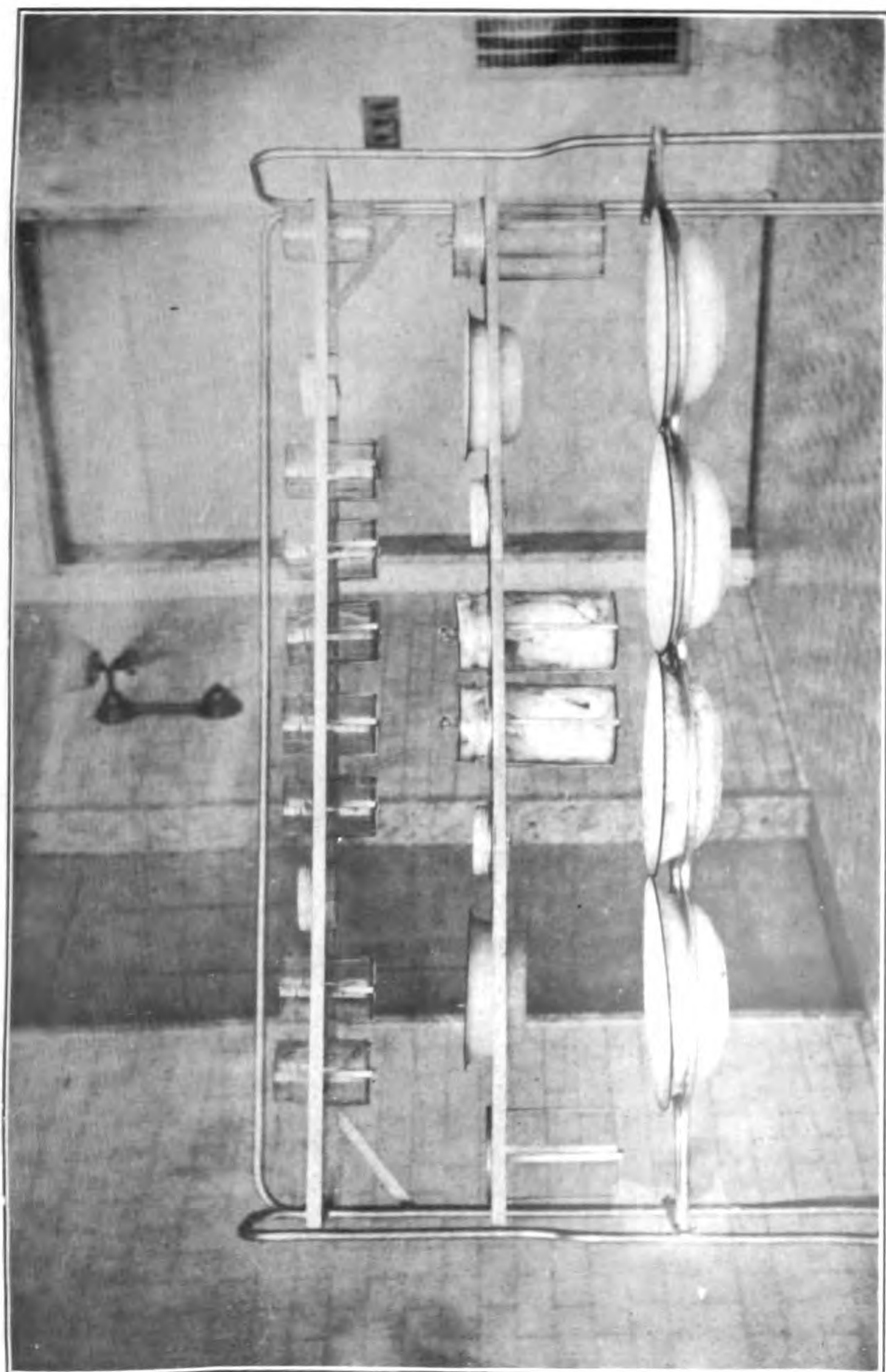
The medical officers of the *Rhode Island* on the trip home with the battle-ship fleet from Manila attempted to diminish venereal infections in the same manner as had been done on the *Baltimore*:

1. Instruction of the crew, during first-aid instruction, of the causes of venereal diseases and efficient methods of prevention.

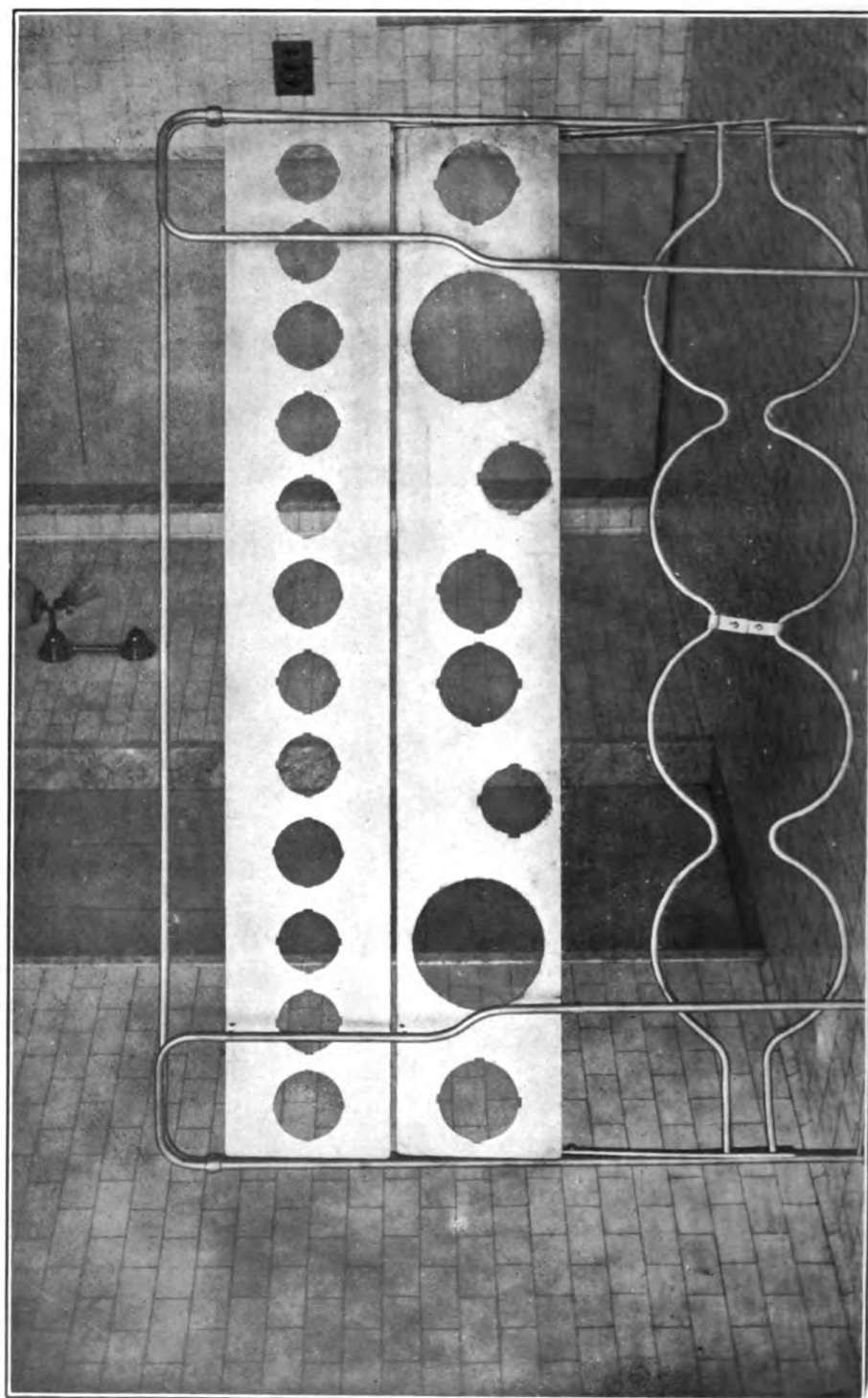
2. The administration of preventive treatment for venereal infection to all men returning from liberty. A copy of the liberty list was sent down to the sick bay and all liberty men were checked off when they returned from liberty. Each man was asked if he had been exposed and if the reply was in the affirmative he proceeded as did the crew of the *Baltimore*.

About one man in twenty of the returning liberty parties stated that he had not subjected himself to infection. Observation of the glans penis of the men before they washed showed a filthy condition of affairs. Evidently they had had no opportunity to wash themselves while on shore.

At first the sick bay was used to administer the preventive treatment, but the large number of men disturbed the sick, so the unused side of the head was pressed into commission. Here were placed long double platforms built in the manner of steps, the first step or platform being 2 feet from the deck, the second 3 feet. There was room on this for 10 men to take treatment at the same time. The top platform was utilized for syringes, the protargol solution, cotton, and the calomel ointment. The lower platform contained 10 basins containing the bichloride of mercury solution and 10 buckets on the deck, in which to throw the cotton and in which to deposit the injection from the penis, completed the necessary furniture. A hospital apprentice stood on the opposite side of the men and gave the necessary instructions. Many of the men had to be instructed in the proper manner in which to take an urethral injection.



PROPYLAXIS STAND SPEAR



PROPHYLAXIS STAND (FOLDED)

Some difficulty was experienced in getting all the liberty men to report at the sick bay. If the commanding officer would consider it a breach of discipline if a man did not report at the sick bay on returning from liberty and punish accordingly, and if he would further punish men who developed venereal diseases when they declared that they had not been exposed, the work of the medical officers would be simplified.

It is believed that almost all venereal infection can be prevented if men present themselves for treatment within twenty-four hours after exposure, and in many cases forty-eight hours seems not too long a lapse in which to prevent disaster.

The following cases of venereal infection occurred while the ship was at Marseilles, from January 16 to January 28, 1909: During this period of time all men on the ship were given liberty once; most of the crew, however, had three liberties. Liberty was given daily, and the liberty parties averaged 250 men. There is a great deal of venereal disease in Marseilles, as it is the largest shipping center in the Mediterranean. Calculating that the whole crew went on liberty three times would give 3 by 800 or 2,400 exposures; deducting 5 per cent for the men who did not expose themselves would make 2,280 actual exposures. One week after the ship left Marseilles 13 cases of gonorrhea had developed, only two of these had taken the preventive treatment. Eleven cases of venereal ulcer, chancroidal in character, had developed, 6 of which received the preventive treatment. Most of the chancroids contracted by the American sailors in Marseilles were very active, and the incubation period in some cases was only a few hours. These infections could have been prevented after exposure by a prompt cleansing of the parts, a procedure most difficult to accomplish under the existing conditions of filth in which many of the prostitutes of Marseilles live.

Considering the fact that 80 per cent of the women in a certain section of Marseilles are infected with some sort of venereal disease, and considering the amount of liberty given to the crew while in that port and that 100 men overstayed their leave, the actual number of venereal infections is small and demonstrates clearly the value of preventive treatment.

Metallic stands constructed in units of ten or less could easily be made by makers of such articles. Then if issued to the ships in service they would simplify the administration of the treatment.

With this idea in view a metallic stand has been constructed which folds together and can be stowed in a small space. The photograph is self-explanatory. The unit stand is built for the accommodation of four; the top shelf should contain porcelain receptacles for the unused and used syringes, protargol solution, and calomel ointment, instead of the glass jars shown in the illustration. These will fit one

into the other and so occupy little space when not in use. The second shelf contains basins for the bichloride solution and receptacles for cotton, these receptacles also being made of porcelain. The lowest rack is for basins in which to deposit the injection fluids and soiled cotton. As shown in the second illustration, the stand can be folded, which facilitates compact stowage at sea and when its services are not required.

It is absolutely necessary to have some definite furniture for the administration of the preventive treatment if it is to be made a success.

The problem of handling 250 or 300 men in a short space of time can only be accomplished by providing adequate means for giving quick treatment. Ten unit stands of four each will accommodate 40 men at one time. These stands could be rigged on the deck near the heads and could be temporarily screened off. Allowing five minutes to each man, 200 men could receive treatment in the space of twenty-five minutes.

As the efficiency of the navy has been improved by eradicating all water-born diseases by the use of distilled water, so now we can greatly increase the efficiency of the personnel if we can clear our sick bays of the venereal cases that have always been present. This can be done by meeting the issue squarely by proper, energetic, and well-directed methods.

THE RATIONAL TREATMENT OF ARTERIOSCLEROSIS.

By Surg. C. H. T. LOWNDES, U. S. Navy.

While on duty some years ago at the United States Naval Hospital, Philadelphia, where at that time the great majority of the patients were the inmates at the Naval Home who came to the hospital but to die, I was impressed with the unsatisfactory treatment of arteriosclerosis, how little we could do for them, and how useless were the drugs commonly said to be of value. Subsequently I was assigned to other stations, where a case of arteriosclerosis was almost unknown, and it was not until I was detailed to my present duty, that of attending surgeon in Washington on the retired officers of the Navy and Marine Corps, that I again came in contact with this class of cases. Remembering my past experience, I determined to see if more could not be done to help if not actually to prolong the lives of these unhappy patients, for when the curtain was pushed aside many somber pictures were seen, where at best only faint rays of hope penetrated. Unfortunately, when many of these cases came under my professional care the damage was irreparable, little could be done, and sad indeed was the prognosis.

It must be understood that this paper primarily treats of our own people, particularly the retired officers, yet is of course applicable to all suffering from this diseased condition. No claim for originality is here made in the treatment of arteriosclerosis. I merely relate the form of treatment which has seemed of value.

The scope of this paper will not permit me to speak of the etiology, the pathology, and symptomatology of this interesting disease, yet I can not refrain from quoting a few facts I have gleaned from my reading and my experience. In discussing the etiology of this trouble one author, under the heading "Race as an etiological factor," makes this surprising statement: "Not only is this disease more frequent in the negro, but the age of onset is much earlier than in the white. The accidents of arteriosclerosis, viz. aneurism, cerebral hemorrhage, etc., are more among the negro than in the white males. The etiological factors that are most often found in the history of these cases are the prevalence of syphilis and hard physical labor."

While syphilis, alcohol, and overeating are undeniably the three most potent predisposing causes of arteriosclerosis, and chronic disease of the kidney is one of the most certain producers of high arterial tension, yet I would name two other causes not mentioned by writers of this disease, but which medical officers of the navy frequently see:

First, I will mention *muscular overwork*; not the hard, physical labor of the coal passer, but that of the trained athlete, who comes to us first with an athletic heart, the trouble originating perhaps when a midshipman at the Naval Academy. The second cause may be expressed as *the nervous wear and tear incident to life aboard the modern battle ship*.

To support the latter as a causative factor all that is necessary is to examine the sailor or officer (who has reached 40 years of age) at the beginning of the cruise and again in three years, when the cruise comes to an end, and note the change in his physical condition.

Before speaking of the treatment proper of arteriosclerosis, I will suggest one feature of the *prophylaxis* of this disease.

Under the new order, where every commissioned and warrant officer is required to take the annual physical test, this prophylaxis is easy to put into practical application. It should be the duty of every medical officer making the prescribed physical examination, if he suspects any increase in the arterial tension or if he discovers any of the warning signs of arteriosclerosis, to so inform the officer of his condition, to warn him of his danger, and to prescribe the proper mode of living, and this I consider the first step in the rational treatment of this disease. So important are these frequent physical examinations considered that some physicians advise those members of their clientele who have reached the age of 40, women as well as men, to present themselves twice each year for physical

examination; in other words, it becomes us as medical officers of the navy to act the part of guardians of the health of our shipmates, and only in this way is the prophylaxis of arteriosclerosis possible.

Treatment.—In a recent work on the disease these words are found: "Arteriosclerosis is essentially a chronic progressive disease, and the management of it is not to treat the disease or the stage of the disease, but to treat the patient who has the disease;" therefore it becomes, first, necessary to study the patient, his character, his habits, his previous mode of living, and then to outline the plan of treatment, which must fall under two divisions, prophylactic and medicinal.

Probably of all our prophylactic measures, out-of-door exercise is one of the most important, especially since it is the tendency of the great majority of naval officers, when they go on the retired list, to practically discontinue all forms of exercise; a short walk to the club is all they seem to think they need. This is absolutely wrong; further walking should be counseled. I make my patients buy pedometers and try to get them to walk 5 miles daily, and if they can find it practicable I advise golf, which is certainly the exercise for the middle-aged man and for even the old man. Other forms of exercise like tennis, swimming, etc., are to be condemned, and if horse-back riding is to be allowed, its effects must be carefully watched. If the patient can not get out some form of exercise in the room with the windows wide open must be practiced, preferably chest exercise with weights, which cause deep breathing; but the time will come when, on account of vertigo, etc., no exercise can be allowed, and even then I do not allow my patients to take to their beds, for once in bed they give up hope, become weak, and are in danger of œdema of the lungs. In this stage, twice daily, for an hour at a time my patient is placed in a comfortable chair before the open window, and this is supplemented by passive exercise in the form of gentle massage. As arteriosclerosis is so frequently associated with chronic nephritis, the skin must be made to do its share of work, and this is promoted by tepid or even warm baths. The morning cold sponge bath must be used with caution. Turkish or Russian baths are to be discountenanced, and the Nauheim baths can not be trusted in this condition. One case I personally know them to have positively harmed.

In considering the habits of the patient, every care must be taken to correct constipation; this is most important. In my own practice I avoid the use of cathartics as much as possible, substituting hygienic treatment, supplementing this by coarse foods when possible and by the use of what I call "Bran gems," made of wheat bran, whole wheat flour, black molasses, etc.; of these the patient should eat one or two daily; then I am not opposed to the moderate use of tobacco.

the morning and evening cigar can do no harm. As to the use of alcohol I am still in doubt; a small amount of well-diluted whisky before meals, in some cases, certainly helps digestion and, I believe, does no harm except in advanced cases. Of the dietetic treatment I admit I have no invariable rule; I interdict red meats and favor other meats only in moderation. My patient is encouraged to cultivate the popular fad of vegetarianism and to reduce the total amount of food rather than to omit many articles. I restrict at times the taking of large amounts of liquids, the popular idea of flushing the kidneys is unfortunate for it certainly raises the blood pressure; a glass of boiled water at meals, sipped slowly, a glass before breakfast and again before retiring usually suffices. If the patient complains of hunger, thirst, or misses meat, an occasional glass of milk or, better, buttermilk is permissible. In my own practice I delay the employment of *medicines* as long as possible, prescribing the diet, the daily exercise, and the general mode of living, which suffices when the patient's blood pressure is moderately high and no disagreeable symptoms exist; but if the dull throbbing headache and precordial pain is present, nothing does more good than the iodides, which certainly lower the blood pressure. Of course if syphilis is suspected, the iodides may be given in full doses, but for the uncomplicated case of arteriosclerosis in the early stage, my plan is to begin with sodium iodide, 5 grains, increase to 10 grains, well diluted in not less than half a glass of water, to be taken after meals. I continue the iodides for two weeks, stop one week, then resume the drug, and so on. The time too soon comes when it is necessary to stop the iodides or at least supplement them by the nitrites, which salts have the power of markedly reducing the blood pressure and of equalizing the circulation, and I believe when given with proper precaution are practically without danger. I use the sodium nitrite in 1 to 3 grain doses in solution every four hours, simply because its effects are more lasting than are to be derived from the tablets of nitro-glycerine, gr. 1/100 to 1/50, which will be found more convenient in some cases, when they may be given every four hours as the condition requires. While personally I consider the iodides and nitrites the only drugs of real value in the treatment of arteriosclerosis, still small doses of thyroid extract, gr. 1/3 morning and night, are recommended. One of the latest authorities on this disease states that he has had excellent results with a mixture of tincture of aconite and spirits of nitrous ether. I have had no experience with fibrolysin or the so-called serum of Trunecek, which are given hypodermatically, but because the injections are painful and tedious, a tablet preparation known as antisclerosin has been placed on the market. This is said to represent the salts contained in blood serum and it is claimed that the administration of the inorganic blood salts in arteriosclerosis promotes

vascular metabolism, strengthens the vasomotors, and reduces the blood pressure. Beyond this the treatment of arteriosclerosis becomes symptomatic, because in the later stages the disease loses its identity and the treatment must be directed to the cerebral, cardiac, and renal complications. During the course of treatment no class of drugs will reduce the blood pressure so much as or can take the place of absolute rest in bed and careful restriction of the diet. This rest treatment should be employed from time to time, depending upon the patient's condition. The plan of treatment comprises:

First, a study of the patient, prescribing exactly how he should live and what he should eat and drink.

Second, the attempt to remove all sources of mental anxiety and worry, and to place him, if possible, in a calm but cheerful environment. Psychic activity in the form of worry certainly increases arterial tension.

Third, the correction of constipation and the accomplishment of a daily bowel movement, which is not only important in the treatment but also in the prognosis of the disease.

Fourth, the administration in the early stage of the disease of the minimum amount of medicine, for the time will too soon come when the few appropriate medical agents at our command will be needed. After all has been said the rational treatment of arteriosclerosis is to treat the patient and not the disease.

TREATMENT OF SYPHILIS AT HOT SPRINGS, ARK.

By Passed Asst. Surg. W. S. HOEN, U. S. Navy.

In the treatment of this infection resort is had almost entirely to the method by inunction, and from the results obtained it certainly deserves the reputation it has gained here.

Under this form of administration I have seen lesions, that have resisted every form of medication, heal and disappear as if by magic. A few cases are given as examples at the end of this paper.

Other forms of administration are used here, notably the hypodermic injection of grey oil, but inunction is almost universally used by the leading syphilographers.

Under the daily inspection of the patient by his physician doses of *unguentum hydrarg.* can be given that greatly exceed the doses given by the authorities as the proper amount to be used for this form of administration. For example, Taylor says the dose should be 4 grams increased if tolerated to 6 grams of the blue ointment, 50 per cent strength, rubbed into the body, in different places daily. He states that a patient will usually have to abandon this form of treat-

ment by the end of thirty rubs. Here it is nothing unusual to see the rubs consist of 8 grams, and doses of 6 grams and 7 grams is the routine.

This dosage is made possible by the careful attention the physician gives to the care of the patient's teeth and mouth, and to the beneficial effects of the hot baths, which stimulate the skin secretions and promote the internal metabolism of the digestive and excretory tracts.

Another large factor in the success obtained here is, in my opinion, due to the mental state of the patient. He comes here feeling that he will be cured, and all of his energies are directed to carrying out the instructions given by his physician, as to regularity of meals and articles of diet permitted, regularity of taking medicine, and the absence of business cares. Another very important factor is this: The patient does not feel that he has to conceal his disease from everyone, and is not in constant dread that his ailment will be discovered and he disgraced.

Reports from the Wasserman Laboratory, in Chicago, state: Cases treated by the inunction method, compared to all other methods, show that the return of a positive reaction to the test is longer delayed after inunction than by any other. In other words, inunction exerts a longer action on the specific infection than any other form of treatment. This being the case it would seem to be the form best suited to the naval service in treating its luetics. The way the method is practiced here it could easily be adapted to the needs of the service and at small expense.

The unpleasant features usually attendant on a course of inunctions are greatly reduced and no one need object to them. The equipment that would be needed would consist of a rubbing machine of some sort; I would suggest the ordinary massage machine, used by all barbers, which can be run on the ship's circuit, or, if wanted for other uses, one of the electric vibrators. Also, for the proper treatment of the mouth, nose, and throat, a compressed air nebulizer. A room for the baths could be easily arranged in any of our hospitals at small cost, and aboard ship the bath room adjacent to the sick bay could be used easily.

The method in detail.—The patient is given a hot bath of 98° F. in which he lies for fifteen minutes. Just before getting out of the tub he rubs his whole body briskly with a bath mit or a soft brush to stimulate the skin. After leaving the bath he should cover up well in a blanket with a hot water bottle at his feet to promote diaphoresis. This sweating should take about ten minutes, after which he should cool off for about thirty minutes. He is then ready for his rub. This is given daily, and is applied to the broad surface of the back, being rubbed with the machine until the surface becomes almost

dry. This usually takes from ten to twenty minutes, depending on the amount of ointment used. The undershirt that is worn over these rubs need not be changed oftener than once a week or ten days, and is the only garment soiled. This form of treatment may be kept up daily for two months or longer, depending on the patient's general health, but an average course of thirty rubs will usually be sufficient to get the disease well under control and allow a rest period of a month or six weeks before another course is due. This applies to the simple cases which respond readily to the treatment. In stubborn cases, and in those showing ulcerative or early malignant tertiary manifestations, the use of the iodides is demanded in connection with the mercurial. In the malignant cases, with marked cachexia, the dosage of the mercurial must be small at first and gradually increased as the general health improves. -

The time required for the treatment of specific cases here varies, but as a general rule the following outline can be followed if the case does not need any modification: Thirty daily rubs with or without iodides; twenty days rest; thirty rubs with or without iodides. The patient can then go home and every other month take mixed treatment for a year. Then it is recommended that he return for another course of rubs as in the first year *but this time the iodides are given*.

In the hygiene of the mouth a daily spray of hydrogen peroxide, full strength, to the gums, using about 50 pounds pressure in the nebulizer keeps any tendency to salivation down, and will also cure pyorrhœa alveolaris.

The whole time the patient is undergoing the inunctions he should be kept on a course of tonics, of the iron, quinine, and strychnine type. The first ounce of ointment should be divided into seven parts, and when these have been used, 6-gram doses should be given, and if well borne, 8 grams may be used toward the end of the course.

Each case will be a law unto itself and the dosage must be varied, but the general principle is that each patient should have as much mercury as he can easily and comfortably carry.

The iodides.—One of the greatest errors made in treating syphilis is in the use of the iodides. We are taught that they are not needed in the secondary stage. This is true only when the secondaries are extremely mild and evanescent and respond rapidly to the mercurial. Any secondary that resists ordinary medication, or shows ulceration, or such secondaries as headache, periostitis, myositis, neuralgia, etc., call for the prompt administration of the iodides and *in increasing doses*. Sodium iodide seems to be borne by the stomach better than the potassium salts, and for that reason seems preferable. The usual dosage is 10 drops of a saturated solution, to be increased 5 drops a dose until 60 drops t. i. d. is reached, when the patient drops back to 10 and increases 5 drops a dose again. Of course, while

giving the iodides, attention must be paid to overdosing, though the coryza, if it is produced by a small dose, will often disappear on increasing the dose.

While the patient is taking iodides, a nasal spray of camphor and menthol aa grs. viii, carbolic acid grs. iii in albolene oz. i adds greatly to the comfort of the patient. In those cases where iodides cause great gastric disturbance the administration of the drug may be brought about by using salol-coated capsules or rectal injections.

Local treatment of open lesions of throat, mouth, and tongue.—The most efficient application to mucus patches, erosions, and ulcerations in this locality is either a 6 per cent silver nitrate solution or a solution of hydrarg. biniodide grs. ii to tincture of iodine oz. i.

Instructions given the patient.—He must not eat anything sour or acid, especially tomatoes, which salivate promptly; otherwise his diet need not be restricted. He must cleanse his teeth at least four times a day, after meals and before going to bed, with a good liquid dentifrice. Powders for the teeth are not good as the prepared chalk in them seems to irritate the gum margins.

He should drink plenty of water and see that his bowels move at least once daily.

Case I.—Contracted syphilis about two years ago. He was under treatment nearly the whole time, getting his medication by the mouth and in large doses. About six months ago he developed a large tubercular syphilide in the small of his back, which rapidly extended over the buttocks and up to the shoulder blades. When he reported here for treatment the whole mass was raised, dark red, and extending. After seventeen rubs with 8-gm. applications of ung. hydrarg. the area is now smooth and normal except for the color, which is rapidly bleaching out.

Case II.—Contracted syphilis about six months ago. He was given about six rubs and then put on mouth treatment. About two months ago was paralyzed from about the last dorsal vertebra downward with loss of bladder and bowel control. The paralysis was in the motor tract of the cord, giving ataxia. This patient under seven inunctions of 6 gm. each and increasing dosage of iodides can now walk without the use of a cane and is rapidly regaining bladder and bowel control.

Case III.—Date of infection doubtful. Came here, after vigorous intramuscular treatment, with necrosis of the bones of one toe, sensory and partial motor paralysis of arms and fingers, headaches, and great debility. Under fourteen rubs the bone lesion has healed, sensation and motion are returning, and his general health has improved to such an extent that he is able to resume his business with interest and pleasure.

SUGGESTED DEVICES.

A PORTABLE SANITARY SCUTTLE-BUTT.

By Surg. E. G. PARKER, U. S. Navy.

Ideal as is the present scuttle-butt, with its Gates type of drinking terminal for furnishing drinking water to those who use this system exclusively, yet since this is not possible for all on board I desire to call attention to a sanitary defect in the general supply of drinking water on our vessels. I refer particularly to the force at work in the firerooms. These members of the ship's company are large consumers of water, and the system of supply to them is open to distinct criticism.

At present the fireroom force is supplied by means of open buckets, using a common drinking cup. This method, although time honored, is bad, and there is great danger of spread of such diseases as are communicated by mouth secretions by drinking cups.

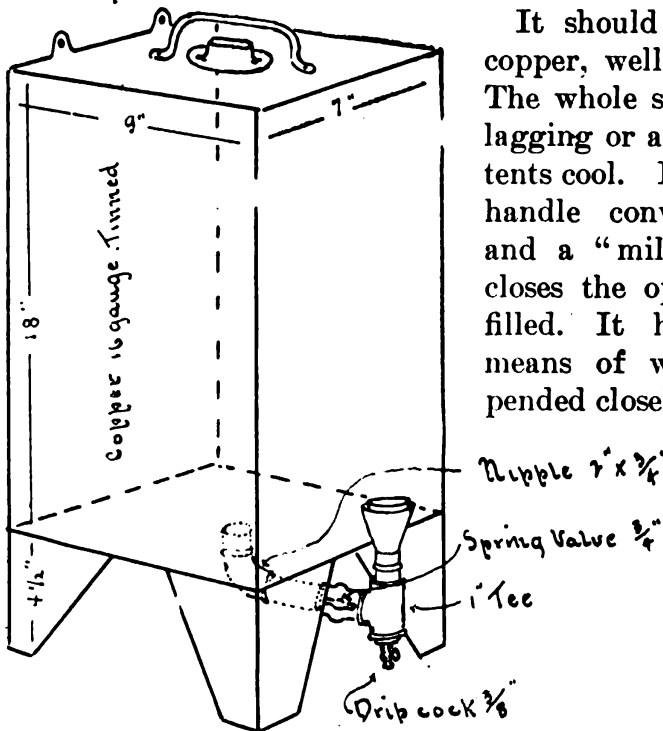
During an epidemic of mumps on this ship some time ago the disease was confined almost exclusively to the fireroom force, and its spread was difficult to check. I felt at the time that the common drinking cup was a prolific source of contagion. To obviate this a second bucket, containing antiseptic solution, was employed, and the drinking cup was to be kept immersed in this solution. This method was not in the least successful, since the constant use of the drinking cup made it impossible to keep it submerged for a sufficient length of time to insure complete sterilization. Again, in spite of the "poison warning," the red-cross sign, etc., on the bucket containing the antiseptic solution, the men would frequently ignore the signs and drink the solution. Upon discovering the error they would rush to the sick bay in justifiable alarm. This of course precluded the use of antiseptics of efficient strength. Also it was found in many instances that the antiseptic solution, although provided, would not be used, for, with a number of men waiting to drink, the cup would be passed from man to man without the slightest attempt at cleansing. Except the above-mentioned defects be corrected it is reasonable to expect extensive crippling of the fireroom force should contagious disease break out among them.

I believe a direct lead from the water supply at the deck scuttle-butt to the fireroom is not feasible since this would entail piping through the protective deck.

I have the honor to offer the device below to be described, which I can recommend, and which I feel is vastly superior to the present bucket system and a marked sanitary improvement.

The idea is essentially a portable scuttle-butt with the Gates type of drinking terminal. As suspended on a fore-and-aft bulkhead it has the following dimensions: Nine inches fore and aft, 7 inches athwartships, by 18 inches high.

The scuttle-butt has a capacity of 5 gallons, and is of such shape that when suspended by its hangers it hugs the bulkhead closely and is not in the least in the way.



It should be of No. 16 gauge copper, well tinned on the inside. The whole should be covered with lagging or asbestos to keep its contents cool. It is fitted with a broad handle convenient for carrying, and a "milk-can" type of cover closes the opening by which it is filled. It has two hangers, by means of which it may be suspended closely against the bulkhead and at a convenient height for drinking. Substantial legs are provided, so that it may be set on the deck and filled from the deck scuttle-butt. These legs are of such form as will

protect the drinking terminal from injury during transportation.

The accompanying sketch will more fully represent the details.

The drinking terminal is of the Gates type and the pipe connections of the standard castings now used in the navy. These are assembled in the following order:

- No. 1, $\frac{3}{4}$ by 2 inch nipple.
- No. 2, $\frac{3}{4}$ -inch elbow.
- No. 3, $\frac{3}{4}$ by 2 inch nipple.
- No. 4, $\frac{3}{4}$ -inch coupling.
- No. 5, $\frac{3}{4}$ -inch spring valve.
- No. 6, 1-inch tee.
- No. 7, $\frac{3}{8}$ -inch drip cock at bottom of tee.
- No. 8, $\frac{1}{4}$ -inch feed pipe to drinking bowl.
- No. 9, waste cup.

If assembled in this order, the drinking cup comes on a level with the bottom of scuttle-butt and at a proper distance for drinking. Waste water is drawn off from time to time by the drip cock. It is readily carried and filled at the deck scuttle-butt.

It is contemplated that one portable of this type be provided for each pair of firerooms. It should be suspended on the fore-and-aft bulkhead near the communicating door.

SUGGESTIONS FOR DIET KITCHEN EQUIPMENT.

By Hospital Steward STEPHEN WIERZBICKI, U. S. Navy.

The question of diet at a hospital, both as to preparation of food and its distribution, is a very important one. Especially is this so in a tuberculosis hospital where so much depends on keeping up the vitality of the patient.

This article deals exclusively with suggestions as to a diet kitchen gained from actual experience. By diet kitchen I mean a kitchen designed for the special use of bedridden patients from which regular meals are to be distributed and in which light food can be prepared and cooking done by a nurse for patients requiring nourishment between regular meal hours.

A diet kitchen, in order to fulfill the above requirements, must serve:

- (a) As central distributing station for food brought from the main kitchen;
- (b) As a place where food can be prepared for patients requiring nourishment between meal times;
- (c) Where staple articles for preparation of light diets are kept;
- (d) Where ice is on hand for ward uses.

With these objects in view the following equipment has been planned for the men's infirmary diet kitchen at the United States Naval Hospital, Las Animas, Colo.: Electric kitchen cabinet, steam table, combination urn, dish closet, kitchen cabinet, table, ice box, sink, and food trucks with trays.

Sketch No. 1 shows the ground plan of the diet kitchen and what seems to me the most convenient arrangement of the stationary equipment.

Electric kitchen cabinet.—This is one of the most useful arrangements that could be placed in a diet kitchen. It consists of a main cabinet with switchboard to which all the different cooking utensils can be attached, with cupboard underneath for utensils not in use. A side table hooked onto the cabinet serves as a stand for an electric roaster. Other attachments consist of a frying pan, a toaster, a double boiler, a tea kettle, a coffee percolator, a broiler, and a com-

bination cooker. A nurse versed in the rudiments of dietetics can cook a very good meal on this electric kitchen, and the simplicity of it, as well as the absence of smoke, heat, and dirt, recommend it as preferable to a range.

Steam table.—The steam table planned for the diet kitchen differs somewhat from those in ordinary use. Instead of the steel enameled meat platters generally found, the table has two holes cut into the top into which removable food containers (10 by 18 inches and 6 inches deep) are fitted. As soon as the food is placed in these pans in the main kitchen they are brought up to the diet kitchen and placed into their openings in the steam table. The distribution of food can go on for any length of time, the food remaining hot and palatable, as there is no drying out under the even, moist, steam heat. In addition to the food containers above described there are four crocks in the steam table. Milk, cocoa, cereals, etc., can be cooked in them and kept warm the whole day without danger of burning. The lower part of the steam table is utilized as a plate warmer. It extends the entire length of the table and has two partitions with sliding doors on each side, allowing dishes to be kept hot at all times and to be taken from either side. I might mention that the steam table in the main kitchen is also fitted with removable food containers interchangeable with those in the diet kitchen. This insures rapid service, for while the food is being distributed from one set in the diet kitchen other containers are being filled in the main kitchen.

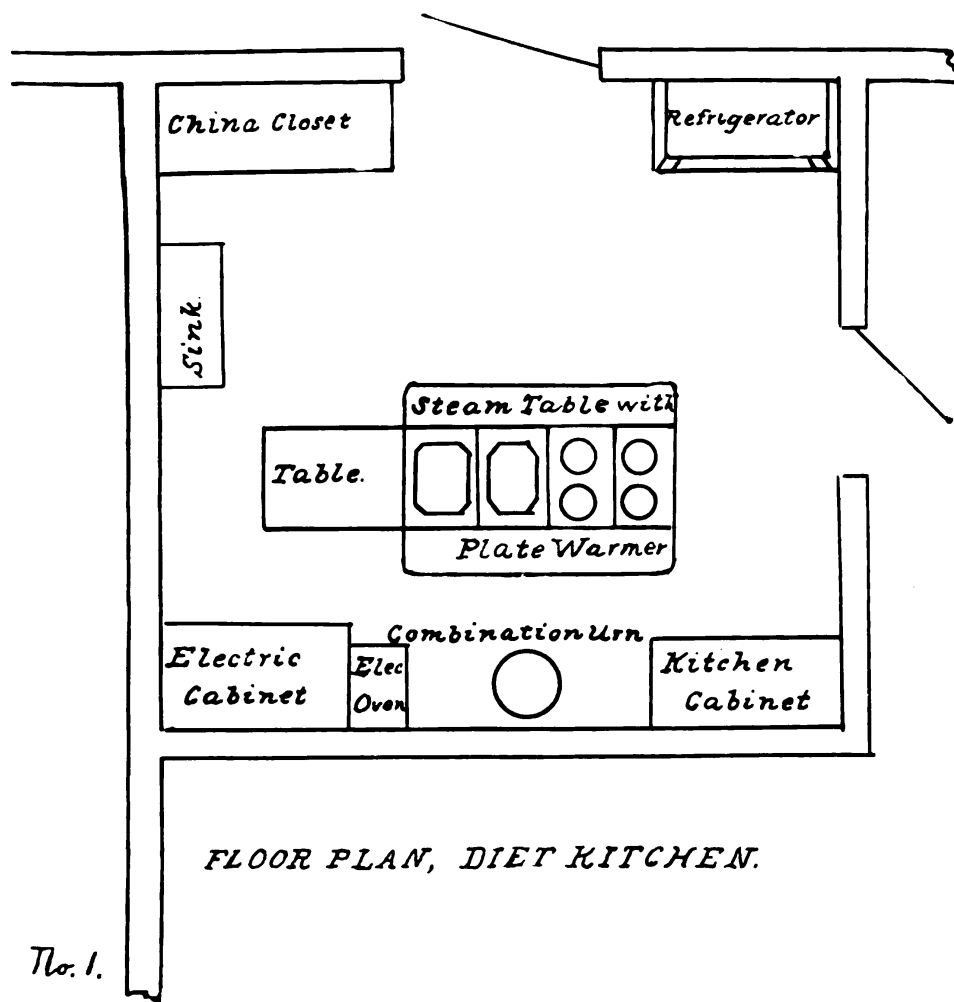
Combination urn.—A copper urn of any desired capacity is divided into three compartments. Ice water is kept in one. This cools the walls of the other two which can be utilized for milk, cream, or any other fluid that may be desired. The compartments are fitted with separate screw-cap faucets.

Dish closet.—A certain number of dishes and certain amount of tableware must be allowed the diet kitchen, corresponding to the number of patients to be supplied. These are conveniently kept in the dish closet.

Kitchen cabinet.—Staples, such as sugar, flour, salt, pepper, canned soups, etc., which are in constant demand, are kept in the kitchen cabinet.

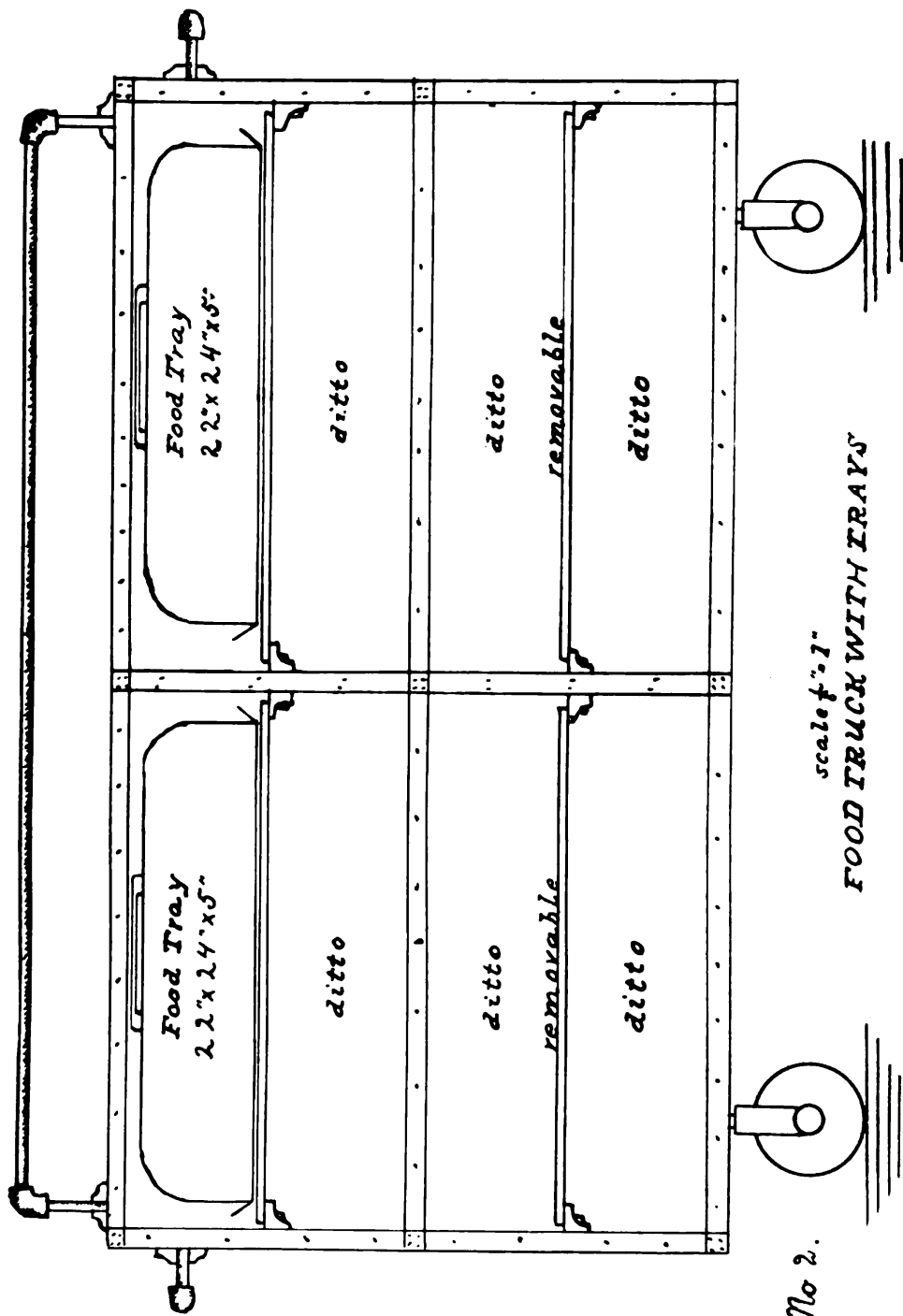
Table, ice box, and sink.—All these are absolute necessities for a diet kitchen and require no description. The ice box should of course be selected with a view to keeping sufficient quantity of ice and other necessities on hand to meet all the demands for a whole day, so that one delivery daily of all articles will be sufficient.

Food trucks with trays.—The food truck shown in sketch No. 2 has the following dimensions: Length, 50 inches; height, 30 inches; width, 26 inches. It is constructed from galvanized iron with a railing on top and is mounted on reversible rubber casters. It has a handle at each end, thus doing away with the necessity for turning it. an



FLOOR PLAN, DIET KITCHEN.

No. 1.



advantage in narrow hallways and small rooms. The inside partitions are 6 inches apart and, except the middle one, which is stationary, serving as a brace, are removable, so that the truck can be used (1) for transferring the large food containers fitted to the steam table from the main kitchen to the diet kitchen, and (2) for delivering the individual trays. The individual serving trays are made from nickle-plated steel and have nickeled copper lift-off covers 5 inches high to protect the food from cold and dust during delivery. The size of the trays (22 by 24 inches) is such that a complete meal can be placed on them, and they can be used on the patient's bed-side table or on a table in his room without removing anything from them. Eight such trays can be placed in the food carriage proper, and 2 if necessary on top, making 10 meals that can be delivered on one trip. Experiments made in this hospital show that two attendants can deliver 10 meals, after the trays have been placed in the food truck, in three minutes, and one attendant in five minutes. These wagons could be made to carry a greater number of trays, but their increased size would probably make them unwieldy and too heavy for practical use. The top of the truck can be used for articles which can not be handled with hot foods, such as ice cream or cold desserts. The sketch of the truck shows a handle on top of the tray covers; instead of this the handles are located on the ends, leaving the tray cover perfectly flat. This allows trays to be placed one on top of the other, with dishes arranged for the reception of food, and insures quicker distribution of food and requires much less space for the trays.

The advantages of a diet kitchen equipped as above suggested are so evident that it is hardly necessary to point them out. The most important points in their favor, however, are that food can be distributed quickly and brought to the patient hot and palatable, light diets can be prepared easily at all times of the day or night, and conveniences which might be required at any time are within easy reach of the wards and can be made use of with the least amount of work and help.

NOTES ON COLONIC ANESTHESIA.

By Passed Asst. Surg. W. S. PUGH, Jr., U. S. Navy.

Many years ago colonic anesthesia was first proposed and used in France. The exact date and operator's name I do not recall, and in my present position I have been unable to look it up. The pioneer in this line was, however, universally condemned, and his method was spoken of, until recently, as a very dirty way of applying a useful drug, and merely mentioned to be condemned.

An attempt was made to introduce it into the United States in the years 1890 to 1900, but it failed here. The principal cause of failure

was faulty technique, which in several cases resulted in ether entering the bowel, producing bloody enteritis, sloughing of the bowel, and death. Its use was then discontinued and nothing more was heard of it until the writings of Cunningham, of Boston, during the last five years. During the last two years Cunningham's work has been taken up by C. E. Brewer in the Roosevelt Hospital, in New York, where I first saw it demonstrated.

With the present improved apparatus and technique it has now become a most important adjunct to our surgical work.

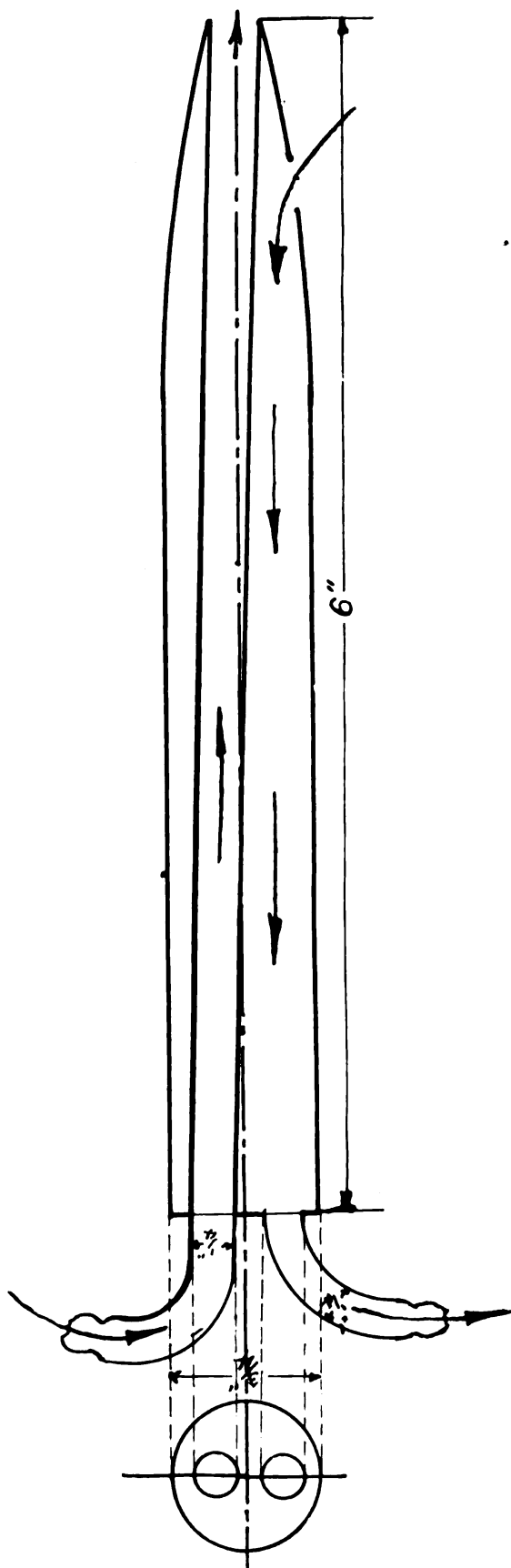
The most important thing preliminary to the application of colonic anesthesia is the thorough cleansing of the intestinal canal. This should be started twenty-four hours before the induction of anesthesia, and when this has been well done there is no reason why this method of anesthesia should not be successful.

Colonic anesthesia finds its chief field of application in operations upon the head and neck, in which positions, under the ordinary methods, much annoyance is often caused by the proximity of the anesthetist to the field of operation. I do not think it advisable in other locations. With this method the anesthetist is always out of the way, and can keep a watch on his patient as well as by the inhalation method.

Induction of anesthesia.—The insertion of a tube into the rectum is not relished by most people. The period of anesthesia is very slow in appearing when started this way. Abdominal distress and vomiting are frequent. I believe that the anesthesia should be started by the inhalation method and then, when the patient is under its influence insert the rectal tube and maintain the anesthesia by rectum. This, I believe, is the common method of procedure. The patient never knows that he has had rectal anesthesia, and as soon as the operator is ready the initial anesthesia is discontinued and the rectal ether is begun.

The apparatus.—The apparatus used in some clinics is very elaborate, but this is not necessary. The following simple device, improvised and made for me by A. F. Strohmman, hospital apprentice, first class, works well and answers all the requirements. It consists of an old battery jar 6 inches high, 4 inches wide, and a circular top 3½ inches in diameter. On one side of the top there is a mouth projection through which a thermometer can be kept inserted.

The large jar is half filled with water kept at 98° F., to aid vaporization of ether. In the center of this jar is then placed a 250 c. c. salt-mouth bottle half full of ether, and a two-holed rubber cork is placed in this. The inner bottle is held in place by a tight-fitting top made of cigar-box wood, which fits snugly the outer vessel. Two glass tubes are inserted into the inner bottle, after the method of the ordinary wash bottle. To the long tube leading into the bottom of the ether bottle proper is attached a double caudery bulb to keep up



RECTAL TUBE FOR COLONIC ANÆSTHESIA.

a continuous flow of vapor. To the efferent tube is attached a rather ingenious device for use as a rectal tube. It consists of a navy isinglass plaster box, three-quarters of an inch wide and 10 inches long. In the rectal end of this tube proper is attached the nozzle of a hard-rubber penis syringe. The nozzle tip is left open and the ether inflow tube, made of hard rubber, passes from the efferent ether tube to this hole, and the gas then passes into the bowel. A hole the same size is made in the lower end of nozzle, and this is connected with another hard-rubber tube, which goes back through original rectal tube and carries off the excess ether in the rectum to the outside, the outflow being controlled by a small valve just beyond the casing. I think, however, that the accompanying drawings illustrate it better than I can describe it.

With this apparatus I have always been able to maintain a good and constant anesthesia; about 50 to 75 grams of ether as a rule has been found to suffice for the longest cases.

I shall not attempt to describe the procedure of colonic anesthesia, as that is probably well known to all.

When the patient is coming out of the anesthetic most operators insert a rubber tube into the rectum to remove the excess vapor, but with our apparatus it has not been found necessary.

The above method has been used aboard this ship in the following cases:

Necrosis of jaw.....	2
Cystic tumor of face.....	1
Removal of bullet in jaw.....	1
Removal of glands of neck.....	2

In all of the above it has proven very satisfactory.

The last anesthetic committee of the American Medical Association submitted the following report on the advantages and disadvantages of rectal etherization:

ADVANTAGES.

1. Post-operative nausea and vomiting have been practically absent with this method, and recovery is rapid.
2. It is well suited for operations on the nose and mouth because the anesthetic materials are out of the way.
3. It is well suited in cases of extreme pulmonary or bronchial involvement.
4. A small amount of ether is used.
5. It is not disagreeable to the patient.
6. There is little or no excitement.

DISADVANTAGES.

1. The induction is unusually long.
2. It fails to produce anesthesia in some cases.
3. It is difficult to regulate the dosage.
4. Colicky pains, diarrhea, and painful distention of the intestines sometimes follow this method of etherization.
5. This method has had some fatalities, although there is a report of 15,000 cases without mortality.

CLINICAL NOTES.

CLINICAL NOTES FROM THE UNITED STATES NAVAL HOSPITAL, MARE ISLAND, CAL.

By Passed Asst. Surg. U. R. WEBB, U. S. Navy.

Five major operations under local anæsthesia.—For anæsthesia in all cases I prefer ether on the open mask, and almost invariably use it; but that local anæsthesia may be advantageously used in a much larger and graver class of cases than is usual at present does not admit of doubt.

In each of the cases noted below there was some contra indication to the use of a general anæsthetic. In case No. 1 the patient had suffered for two years with a ventral hernia and symptoms of partial obstruction of the bowels. He was markedly neurasthenic, depressed and apprehensive, and had a mortal fear of a general anæsthetic, being absolutely sure that he would die under ether; in fact, he refused any operation under general anæsthesia. Under cocaine he stood a rather severe abdominal operation remarkably well.

In case No. 2 there were pressure symptoms from a rather large right-sided goiter, and I thought it advisable to take no chances of the patient's coughing or vomiting during its removal.

In case No. 3 a bronchitis developed just before the day set for his operation.

The patient in case No. 4 was an old man with hard arteries.

In case No. 5 there was the same horror of a general anæsthetic as noted in case No. 1.

Especially noticeable and gratifying in all these cases was the absence of post-operative nausea, thirst, and headache.

Case No. 1.—D. M., chief boatswain, was admitted to hospital on October 11, 1900, suffering with ventral hernia and symptoms of partial obstruction of the bowels. He stated that the condition had existed for about two years, and that it was a result of an appendiceal abscess which had been drained. He was markedly depressed and apprehensive and had lost to a great extent his self-confidence and self-control. He was morbidly fearful of a general anæsthetic and refused absolutely to take one. Finally, however, he consented to operation under cocaine.

On October 25 a large scar with a small hernial sac was dissected out. This occupied the usual site of the right rectus incision for appendicitis. A

wide dense band of adhesion was found binding the cæcum to the anterior abdominal wall. This band was divided with scissors and the gut freed. It was particularly noticed that this band seemed insensitive, and the intra-abdominal work gave the patient no pain. He complained slightly when the neck of the sac was divided, but had no other pain until the placing of the subcuticular suture which gave him some discomfort. The wound was closed in layers in the usual way. This patient was free from shock and from nausea and thirst, and his recovery was rapid and entirely satisfactory.

Case No. 2.—W. J. S., yeoman, first class, was admitted to hospital on October 26, 1909, suffering with a large right-sided goiter. This was first noticed about three years ago, since which time he has been troubled at times with dyspnœa and a "choking" sensation. His eyes were rather prominent, and he was pale and "nervous" though he had no well-marked tremor or tachycardia.

On November 1 under cocaine the enlarged right lobe of the gland was removed. Two parathyroids were found and left with the posterior capsule of the gland to which they were attached. This patient did not complain of pain during the operation.

Case No. 3.—W. K., oller, was admitted to hospital on December 8, 1909, with a recurrent right inguinal hernia. He developed a bronchitis, but the usual Bassini operation, slightly modified, was performed on December 13. This patient did not complain of pain except upon the removal of the sac.

Case No. 4.—D. D., blacksmith, was admitted to hospital on January 3, 1910, with recurrent right inguinal hernia. He is 51 years old, admits that he has been a hard drinker almost all of his life, and his arteries are hard, so at his request cocaine anæsthesia was used. The usual Bassini operation, slightly modified, was performed on January 13. This patient is enthusiastic in his advocacy of local anæsthesia.

Case No. 5.—E. A. M., pay clerk, was admitted to hospital on January 17, 1910, with left inguinal hernia and a large varicocele. The Bassini operation, slightly modified, together with the usual "high" operation for varicocele, was performed through the same incision, under local anæsthesia.

Two solutions were used in these cases: One per cent cocaine in 1-100,000 adrenalin for the skin and one-tenth per cent cocaine in 1-100,000 adrenalin for all underlying tissues. It is very important that the patient be given morph. sulph. gr. $\frac{1}{4}$ with atrop. sulph. gr. $\frac{1}{150}$ hypodermically, one-half to three-quarters of an hour before the operation.

Experience with Beck's bismuth paste.—Our experience with bismuth paste in the treatment of chronic sinuses has been so favorable that it seems worth while to report our few cases.

We have used this method of treatment in eight cases, all of many months' standing, and in all of which nearly every other method of treatment known to us had been used.

Four cases were cured; two after one injection each; one after two injections; and one after nine injections. Two other cases were benefited somewhat. One was not improved and in one there was such a severe reaction with rise of temperature that the injection was not repeated.

We have used only the 33 per cent bismuth in vaseline paste, melted and injected warm. We have endeavored to fill the sinus comfort-

ably, but not to distend it, and we have not used any means to prevent the escape of the paste except to apply a fairly firm gauze pad. The injections have been given twice weekly in some cases and once a week in others.

Especially noticeable in all cases is the almost immediate change in the character of the discharge, usually from purulent, it becomes more serous and slightly bloody for a few days, when, in favorable cases, it ceases and nothing is found on the dressing but small quantities of the paste. We have seen a profuse greenish purulent discharge from an empyema sinus of six months' standing, after one injection of this paste, dry up overnight and the sinus become firmly healed within a week.

That results so striking can be obtained by such simple means in even a small percentage of cases seems remarkable.

C. H. E., seaman, was admitted from the U. S. S. *West Virginia* on May 14, 1909.

At time of admission his condition is recorded as serious. There was a large amount of sero-purulent discharge from an opening $2\frac{1}{2}$ inches long in the right anterior axillary line, the results of an operation for empyema. The right lung was collapsed.

He was treated in the usual manner with irrigations and curettings, etc., with much improvement to his general health. The lung expanded somewhat but the sinus persisted. On September 22 he received his first injection of bismuth paste and at weekly intervals he received eight others, when his sinus was healed, and on December 4 he was allowed to go on leave.

S. E. F., apprentice seaman, was operated upon for empyema on June 21, 1909; 2 inches of the sixth rib resected. He received the usual treatment without results up to October 20, when he was given one injection of the bismuth paste. The discharge ceased immediately and the sinus was healed within a week. He rapidly gained weight and strength, and was discharged to duty on December 13.

K. F. McL., private marine, was under treatment for sinus resulting from subphrenic abscess from January 17, 1908, to September 22, 1909, when he received an injection of bismuth paste; following this he received eight others at weekly intervals with such slight improvement that radical operation was decided on and performed with entirely satisfactory results.

D. H. W., seaman, was under treatment from February 5, 1909, for gunshot wound of left arm which caused fracture of the humerus. This becoming infected resulted in delayed union and two chronic sinuses. These were injected on October 27 and once afterwards, when they healed firmly. He was well on December 1.

G. W. M., ordinary seaman, has been under treatment since April 8, 1908, for a deep sinus in the right cheek, involving the right antrum. He received four injections in October, 1909, but they caused him so much pain that this method of treatment was abandoned.

J. E. S., ordinary seaman, was admitted with pneumonia on March 26, 1908. He developed empyema and was under treatment for this until February 18, 1909. In November, 1909, he was readmitted with a reopened sinus, which healed after one injection of bismuth paste.

C. J. E., oiler, much reduced from prolonged suppuration, received one injection into a chronic sinus in the muscles of the back. He developed a higher temperature and rapid pulse for a day. The injection was not repeated.

A case of double echinococcus cyst of the liver.—P. B., an oiler of about eleven years service in the U. S. Navy, a native of Germany, aged 44 years, was admitted from the U. S. S. *Tennessee* on September 4, 1909, as with hepatitis acuta.

His personal and family history are negative, except that much of his naval service has been in Asiatic waters. He has noticed a feeling of fullness in the right upper abdomen for several years.

About three weeks before admission, during a period of strenuous duty and arduous labor, he began to have pain of a mild type in the epigastrium. This gradually increased until he was no longer able to work. He rapidly became prostrated with fever of a septic type, with drenching night sweats.

The following notes of his case upon admission to hospital, and of the treatment and result are taken from his case paper:

Patient's color and general appearance are very bad; he is very pallid or rather subicteric, conjunctivæ icteric, face drawn and pinched with anxious expression. He has evidently lost much flesh recently, abdomen is distended; edge of liver can be felt 3 inches below costal border. There is complaint of continual pain in upper right quadrant. Temperature septic in type 100° to 103°.5 F.; pulse rapid and slightly irregular.

September 7. Leucocytes 26,400.

September 10. Operation under ether anæsthesia. A long incision in outer border of right rectus was made. The gall bladder was found distended and surrounded by many adhesions. The right lobe of the liver was enormously enlarged, and contained a growth somewhat larger than a large orange, of paler color than normal liver tissue, somewhat nodular and gave deep fluctuation. This growth or abscess was adherent to the transverse colon; it was isolated with gauze and a large trocar thrust deep into it. A large amount of a necrotic gelatinoid substance was evacuated. This contained enormous numbers of membrane-like bodies of about the size and appearance of grape skins. There was a small amount of yellowish pus. A double drainage tube was introduced, surrounded with gauze and the wound closed up to the tube. Time of operation about one hour and twenty minutes. Patient reacted well from anæsthetic.

September 11. Doing well; amount of drainage enormous; streptococcus infection.

September 13. Doing very well; temperature and pulse normal; much bile and bile-stained detritus draining away; allowed soft diet.

September 17. Improving rapidly; gauze packing has been removed.

September 20. Doing well; wound is dressed daily; there is a profuse discharge which is growing more offensive. There is a slight rise of temperature nearly every evening. Patient is not gaining much.

September 29. Heavy shaking chill to-day; wound is not draining well.

October 1. Under cocaine; opening enlarged and a larger tube introduced.

October 2. No improvement; patient is rapidly growing worse; septic temperature; weak rapid pulse.

October 3. Condition of patient is rapidly growing worse; respirations rapid and labored; pulse 132; very weak.

October 4. Patient died at 3.50 p. m. Autopsy revealed two suppurating necrotic echinococcus cysts of the liver. One, the larger, completely filled and replaced the entire left lobe, the other and slightly small cyst had been opened

and drained by the operation of September 10. The larger undrained cyst contained at autopsy an enormous amount of the same fetid gelatinous purulent material which was found in the small cyst at operation, and also a large number of daughter cysts which had not degenerated to such an extent as those found at the operation.

A very long appendix.—C. D. McG., private marine, was admitted on August 12, 1909, as with chronic intestinal catarrh.

At this time he was having six to eight stools a day, accompanied by pain and tenesmus. He was treated without success until October 9, when from a little pain and tenderness in the right iliac region Passed Assistant Surgeon Geiger made a diagnosis of chronic appendicitis.

Operation was performed on October 19, under ether anaesthesia. The base of the appendix and the walls of the caecum were found congested and thickened. The appendix was 7 inches long, it was bent upon itself and extended under and behind the caecum and ascending colon, and was removed with much difficulty, its tip being densely adherent to the fascia near the hilum of the right kidney.

Recovery was prompt and uneventful, and up to the present date he has had no return of his dysenteric symptoms.

REPORT OF SURGICAL CASES FROM THE U. S. S. TACOMA.

By Passed Asst. Surg. W. S. PUGH, Jr., U. S. Navy.

Nephrectomy.—On the night of November 30, 1909, while the U. S. S. *Tacoma* was at anchor in the harbor of Port Limon, Costa Rica, all-night liberty was given the crew, during which time the following incident occurred:

At about 11.30 p. m., W. H. R., water tender, U. S. Navy, had a quarrel with a negro on shore, and while bending over to pick up a fallen object, was stabbed in the right lumbar region. Considerable hemorrhage from the wound took place, a dressing was applied by a local physician, and patient was brought off to the ship.

On arrival aboard ship I noticed that the three men who brought him off were covered with blood, as was also the injured man, so that his hemorrhage must have been considerable.

Patient was very weak, pulse rapid and rather thready, breath smelled strongly of alcohol, and mind considerably confused, so that questioning of patient as to his accident was of little value.

Upon arrival at the sick bay he was placed upon the operating table at once. The only evidence of injury was the wound in right lumbar region. This wound was vertical, about 1½ inches in length, just beyond the margin of the erector spinæ muscle, and beginning about 1 inch below the margin of the last rib of right side. The

wound presented a slightly jagged appearance, as if the instrument used had been dull or twisted about in an endeavor to remove it.

There was considerable gaping of the edges of the wound and much bleeding, which latter ceased shortly after inspection started, and wound appeared to be plugged by a large clot.

The point of bleeding could not be seen, but it was evident that it came from the renal area somewhere, on account of great depth and location of wound.

In order to find out definitely, an incision was made starting at angle formed by erector spinæ and last rib, carried down through original wound, fascia and muscles to the renal space, and in a direction toward the crest of ilium, slightly downward and outward. When this incision was half completed it became evident that the kidney itself was involved. Incision was then completed to crest of ilium, and an attempt was made to bring the kidney into the wound, but without success. Another incision was then started from the center of original incision and carried forward in the direction of the rectus abdominis for about $4\frac{1}{2}$ inches through all structures of abdominal wall to peri-renal space. The kidney was then delivered and the following injury noted: A rough wound starts at hilum of right kidney, and almost bisects the organ. When wound in lumbar region was opened the hemorrhage had started anew, and now it was quite clear that it came almost directly from the renal artery itself. It was impossible to stop the hemorrhage by suture or any other such method, so that clamps were placed upon the pedicle, ureter ligated, and kidney removed. Wounds were then closed with mass silkworm gut sutures, except small area around clamps, and into which area gauze drainage was inserted to the bottom of the wound. All bleeding having been controlled, large sterile dressings were applied, and patient placed on his back. During operation it was necessary to give the patient a small amount of ethyl chloride and ether. After operation patient was in bad condition from excessive loss of blood.

He was then given a pint of normal salt solution intravenously at right elbow without much preparation and 1 pint of saline beneath the left breast. Continuous proctoclysis was given all night. In addition the usual shock treatment was given, strychnia, hot water bags, etc. His pulse at 7 a. m. was 140 and feeble, but gradually began to improve, and he became restless. At 8 a. m. of December 1 he was given another saline infusion of 1 pint into veins of right elbow, and shortly after this he became conscious and began to improve rapidly. At 9 a. m. his pulse was 90 and had greatly improved in volume and strength. Temperature at this time was 101.2° F. During the day (December 1) he drank large quantities of water

and voided about 850 c. c. of urine. During the first day he was allowed milk, of which he took about a pint.

On the second day patient's condition was excellent. Lumbar wound was dressed and found to be draining well. Temperature between 98.6° and 100° F.; pulse, 90. Diet, milk and eggs. He took during the day eight eggs and almost a quart of milk, but vomited twice. Slept considerably and felt well. Urine 1,000 c. c.

December 3. Ate and slept well. Temperature and pulse normal. Wound in lumbar region dressed, clamps on vessels removed, and wound found to be doing well. Urine during twenty-four hours, 1,600 c. c. and normal in character.

December 4. Temperature a. m., 99°; p. m., 101° F. Patient ate and slept well; appetite was excellent; took all the eggs and milk he could be given; urine, 1,650 c. c. At about 4 p. m. he complained of considerable pain at right elbow over site of original intravenous incision. On inspection this wound was found to be red and swollen, and had a bad odor. It was opened up at once, in its entirety, and found to be infected with an evidently virulent organism, a large greenish slough being present. This relieved him considerably. Lumbar wound dressed. Good union taking place, drainage shortened.

December 5. Temperature a. m., 98.6° F.; p. m., 101° F. General condition was good, but evidences of absorption of septic material from elbow wound were still present. Lumbar wound was in excellent condition, and granulations are filling in rapidly around drainage. Urine 1,500 c. c.

December 6. Temperature a. m., 100° F.; p. m., 100.8° F. the rise in temperature being caused by improper drainage at elbow. This was remedied. Lumbar wound in excellent condition. Urine 1,100 c. c.

December 7. All sutures were removed from lumbar wound, primary union having taken place. Granulations were filling in rapidly around drainage area and intravenous wound at elbow was improving slowly. Temperature a. m., 99° F. Ate and slept well; urine 1,800 c. c. up to 5 p. m., when he was transferred to the Colon Hospital, the ship being about to start for a revolution at Bluefields, Nicaragua. Temperature at 8 p. m. was normal.

December 18. Word received from Colon Hospital that patient is in excellent condition, and is having an uneventful convalescence. Passes normal urine in large amounts.

February 14, 1910. Recovery complete. Patient states he feels as well as ever.

In this case the operation was started in a very short time after patient arrived on board, and did not last over twenty minutes.

The operation was performed in a very small space, in which there is hardly enough room to turn around, and there were none of the surgical refinements, such as kidney elevators, to assist us.

My only assistants were the members of the hospital corps.

A case of gangrenous appendicitis with few symptoms.—C. G. K., oiler, reported at the sick bay on the morning of February 5, 1910, complaining of colic in the region of the umbilicus, which he stated had been first noticed early that morning. Family and previous personal history have no bearing on the case.

Examination reveals the following points: Temperature, pulse, and respiration are normal, tongue slightly coated, appetite poor, bowels constipated. Heart and lungs are normal. Urine is normal.

Abdominal examination reveals a sensitive area in the region of the umbilicus, most marked on the right side. There is, however, no rigidity whatever of the right rectus muscle. The only symptom then is the slight pain in the umbilical region.

On admission he was placed in bed at rest, under observation and given an enema consisting of magnesium sulphate, 2 ounces, glycerin, 2 ounces, and water, 3 ounces. A good movement followed, and patient stated that at 10 a. m. he felt a little better. No food was given. At noon February 5, he complained of increasing pain, but location was not changed, nor was rigidity present. Temperature, pulse, and respiration were normal. Blood examination revealed a slight increase in polynuclears and a beginning appendicitis was suspected.

At 8 p. m. temperature, pulse, and respiration were normal and he felt better. An ice cap was applied over area of pain, and patient was given calomel and sodium bicarb., of each 2 grains, to be followed by magnesium sulphate, 1 ounce, and an enema of soapsuds, 1 pint the following morning.

At 8 a. m. of February 6 patient had a sudden severe attack of pain in the right lower quadrant of abdomen, directly over McBurney's point. A slight amount of rigidity was present in right rectus. Temperature, pulse, and respiration were normal. On the presence of a sudden severe attack of pain over the right lower abdominal quadrant and the McBurney area, a diagnosis of appendicitis was made on this one symptom alone.

The great importance which I attach to this symptom in abdominal lesions (sudden severe abdominal pain) is my apology for reporting this case.

Many surgeons tell us in papers and at the meetings of medical societies to wait a little while before operating on a case of appendicitis in order that the patient may reach a so-called interval period, in which the patient will have recovered from the attack, and be in much better condition to stand the shock of an abdominal operation. Be that as it may, I know distinguished surgeons who deliver the above argument, but who invariably operate as soon as the diagnosis is made, despite their teachings, and I am sure most men of experience in dealing with this dangerous little appendage follow their example. A distinguished surgeon of Philadelphia once remarked, "We never know what the appendix vermiformis is doing until we see it," and

the more one sees of appendicitis the more he realizes the truth of that remark.

Those of us who have been fortunate enough to see many cases of appendicitis realize but too well that at times the so-called interval fails to appear. We also are aware that with an incision a little over an inch long, by McBurney's method, or by the Battle-Kammerer-Jalaquer incision, made early in the disease, and done in about ten minutes, there is no shock or so little as to be insignificant.

Operation at 10.30 a. m. February 6, on board the U. S. S. Tacoma, at sea off Greytown, Nicaragua. Anesthesia, ethyl chloride, and ether, preceded one half hour by hypodermatic injection of morphia, gr. 1/4, atropia, gr. 1/100.

Incision 1½ inches long, and about 1½ inches internal to the anterior superior iliac spine of the right side, on the omphalo-spinous line, in the direction of the fibers of the external oblique muscle. External oblique fascia exposed and opened, fibers of muscle separated parallel to their direction. Internal oblique and transversalis muscles treated in the same manner, peritoneum then exposed, grasped with mouse-toothed forceps, and opened. Edges of wound retracted slightly, index finger of right hand introduced into the wound, few adhesions separated and cæcum lifted up with appendix, appendix delivered. One No. 1 catgut ligature placed on meso-appendix, and latter severed. Appendix was then ligated close to the head of colon with No. 3 catgut. A large clamp was placed just beyond and organ amputated with actual cautery. Stump cauterized with same. Cæcum was dropped back and wound closed quickly in layers; no drains. Peritoneum was closed with No. 1 catgut, other layers with No. 2 catgut. Skin closed with three silkworm-gut sutures. Sterile dressings applied. Patient made quick recovery from anesthetic. Duration of operation, about ten minutes.

Examination of appendix showed the organ to be about 3½ inches long, constricted close to its attachment to the cæcum, considerably swollen beyond this point. Tip of appendix is green, and is in early gangrene. Section of appendix reveals numerous concretions, a very small lumen, and a small amount of pus near gangrenous area at tip. Patient had an uneventful convalescence. Union of wound by first intent, all sutures removed, and patient allowed up on the sixth day. Details of after treatment are of little importance, except to say that food and water were started early, which is important. The harm of early food and water, I believe, is exaggerated.

The point I have hoped to bring out in this case is the importance of sudden severe abdominal pain. It is our earliest and most important sign in abdominal affections, and I have had abundant opportunity to verify this statement, in private and service cases which I have seen. It is significant and always means something radically wrong with our patient, and when we go rambling around looking for other trivial things upon which to substantiate our diagnosis, we may be doing our patients a great injustice.

This lesion is not limited to the appendix, but to numerous organs. As shown by the studies of Reginald Fitz, we now know that if severe pain is present over the appendicular region, our diagnosis is appendicitis; if in the epigastrium, it is usually pancreatitis; if

in the region of the ensiform, more than likely a perforated gastric or duodenal ulcer. In typhoid it always means perforation. I can safely say this from a number of cases seen.

In one case of typhoid perforation seen in consultation, the diagnosis was made on sudden severe abdominal pain alone. I found a perforation in the ileum as large as a pencil. The case recovered, but surely would not have done so had we waited for the beautiful text-book pictures of tympany obliteration of liver dullness, etc.

The statement of Deaver, that abdominal pain which requires morphia for its relief really needs a scalpel, is most significant.

Early diagnosis, early operation and simplicity in technique mean quick recovery and low mortality, and bring us closer to the goal we are striving for.

Peri-urethral abscess.—W. M. W., quartermaster, second class, was admitted to the sick bay of the U. S. S. *Tacoma* March 14, 1909, and gave the following history: Three weeks before, while on liberty in New Orleans, he contracted gonorrhea, which appeared four days after intercourse. He then went to a druggist who prescribed what was apparently a notorious proprietary injection. After one week on the above treatment patient states he began having severe attacks of chordee, which would keep him awake most of the night, but for which he was receiving no treatment.

He states that about this time he noticed a slight swelling about the size of a small pea on the under surface of the penis at the penoscrotal junction, but as this caused no pain he gave it little thought, as friends told him it amounted to nothing and would pass away. The swelling instead of disappearing gradually became larger, causing considerable pain and annoyance in walking, and appearing as a heavy weight when sitting down. In the meantime there was practically no improvement in the urethral discharge.

Examination reveals a young man of 21 years of age, who shows evidence of having lost considerable weight; face is pallid and cheeks sunken; walks with difficulty; temperature, 101° F.; pulse, 92; heart and lungs are normal; he is very nervous; tongue is coated, and bowels are constipated.

A profuse greenish-yellow urethral discharge is present which, stained by Wright's method, shows abundant gonococci. Penis is considerably swollen, and at the root of penis a large swelling almost the size of an orange is noted; this mass almost entirely surrounds the penis except for a small area on the dorsal aspect.

The testicles are forced downward by the mass and are painful, the mass appearing to be almost continuous with them. This mass is apparently a peri-urethral abscess of large size.

Further examination reveals two small nodules in the perineum, one on each side of the median line, which are probably swollen Cowper's glands.

The man's general condition was wretched, and it was decided to place him at rest in bed for a couple of days in order to brace him up, and possibly somewhat reduce the swelling. Hot applications of lead water and laudanum were kept over the swelling constantly, and suppositories of opium were required at night to control chordee. At the end of two days the urethral discharge had considerably subsided, and it was found necessary to open the mass.

March 20. Anesthesia, chloroform-ether, preceded one hour by morphia grs. 1/4, atropine grs. 1/100 each hypo. An incision 2 inches long was made on each side of the penis at the peno-scrotal junction in the long axis of body, and extending well down over the scrotum, and the abscess opened. The abscess was apparently made up of compartments, and as each one was broken down by the finger there was a fresh flow of pus. In order to thoroughly drain the abscess it was necessary to open on both sides, and also make another opening almost at the lower border of the scrotum between the testicles, and here there was another free flow of pus of which there was in all about 2½ ounces. After thorough evacuation of pus, wounds were washed out with pure peroxide of hydrogen, and all were found to communicate; following the above, wounds were irrigated with 1 per cent formalin and sterile drains inserted and sterile dressings applied. Patient made good recovery from the anesthetic, no nausea. After the operation patient did well, and at the dressing the following day the wounds contained very little pus, and by the third day were entirely clear.

On the third day all drains were removed, and by the seventh the left side and lower wounds were healed, and the right was healed with exception of a small point. On the ninth day a uriniferous odor was noticed on dressing, and on the tenth a small spray of urine was seen at the small opening referred to which appeared on urination. This shortly healed under daily applications of nitrate of silver. Gonorrhea had entirely subsided and the urine was clear when patient was finally discharged to duty on April 18.

I have submitted the above report in view of the fact that peri-urethral abscess is uncommon as a complication of gonorrhea. Even in a large hospital service of three years I recall but three cases, and they were very mild in comparison with the one here reported.

Ten cases of machete wounds.—At about 3 a. m. of April 30, 1907, while the U. S. S. *Tacoma* was at anchor in the harbor of Santiago de Cuba, I was called by the officer of the deck to see some wounded men who had just been brought aboard.

Upon investigation I found that as the result of a dinner given ashore by members of the crew there later followed a street altercation, in which the police of the above-named town used their machetes extensively. I then had the men taken down to the sick bay, where the following injuries were found:

C. J. P., electrician, third class. Two sharply incised wounds were found upon the posterior aspect of left forearm, a short distance below the elbow joint. The upper and outer wound was at right angles to the long axis of the arm, about 2 inches in width, and extended well into the substance of the supinator longus muscle, almost cleaving it. The severed ends of the muscular structure and the fascia were united with four No. 2 catgut sutures. The second wound was about 3 inches below the first, and extended for about an inch transversely over the posterior surface of the ulna. This wound extended down deep into the substance of the ulna, parallel to its long axis. A portion of the bone projected, resembling very much a green-stick fracture. This wound was cleansed with hydrogen peroxide and sterile normal saline, and the skin closed with three silkworm gut sutures. Both of the above wounds had bled quite freely. Sterile dressings and wire splint applied. Patient made a good recovery.

L. B. D., seaman. Incised wound of left forearm, compound fracture of left ulna, close to and entering wrist joint. On the posterior aspect of the left forearm, about midway between the elbow and the wrist, there is an incised wound about $2\frac{1}{2}$ inches in length, which has passed upward toward the olecranon process, making a small flap in the skin. This was cleansed with normal saline and hydrogen peroxide and closed with five silkworm gut sutures. Over the inner side of wrist joint there is a small transverse wound, about an inch wide, and this apparently passes directly into the wrist joint. A small piece of bone with a piece of cartilage adhering to it lies loose in and projects from the wound. This appears to be a small fragment from the carpal end of the ulna. This was removed, wound closed with three silkworm gut sutures, sterile dressings applied, metallic splint kept on for about two weeks. Good recovery, although wrist was moderately stiff for about two months after.

C. B. S., machinist mate, first class. Long lacerated wound of left side of scalp; incised wound of right arm; incised wound of right leg and over lumbar region. The wound in scalp is about 4 inches long, sharply incised, begins at middle line of skull and extends almost to the zygoma. This was apparently made with the end of a machete, and looks almost like an operative wound. It involves the skin only. Closed by silkworm gut sutures. Wound of right arm is just below and close to elbow joint, and is transverse, small, and of no import. On the outer aspect of right leg, about 3 inches below the external tuberosity of tibia, there is a transverse wound about 2 inches wide, extending from the tibial crest well back over the outer belly of the gastrocnemius muscle. There was a large hematoma around this wound, which was removed, but no bleeding point found. The muscular structure below was considerably torn and bruised, so that sutures would not hold. At this time there was apparently no injury of nerve tissue. Wound closed with silkworm gut; good union. Patient kept in bed about three days. After leaving bed he noticed a weakness in the leg and foot below the injury, and walked with a slight throwing out of the foot. This was still present when I saw this man ashore six months later. In this case there was apparently some injury to the anterior tibial nerve. There is a small incised wound in the midlumbar region. Of the important wounds in this case, that of the scalp was apparently caused by a

sharp instrument, and that in the leg by a dull one, as there was great contusion of muscle substance in the latter.

L. C., ordinary seaman. A lacerated wound about 2 inches long is present over the posterior surface of right forearm, which goes through skin only. There is some contusion around this wound, and it apparently was inflicted by a blunt machete.

G. C., seaman. Incised wound of nose. This man was apparently struck over the nose with a sharp machete, as there is a deep wound extending down between the upper and lower lateral cartilages of nose, which, except for a very small tip of tissue, almost entirely separates it from the rest of the nose. In this condition this man had been swimming about three-quarters of a mile toward the ship when he was picked up by one of our boats. On examination the wound above noted was found very dirty and greasy, the severed piece of tissue was black and very cold, so that there was apparently very little chance to save it. However, it was cleansed with soap and water and bichloride and three sutures of silkworm gut, one on each side and one over center line of nose, were inserted, and the tip lifted into place. This fragment, which had been almost detached, remained very red and dark in color for three days, when it began to clear up and united nicely all around.

L. F., electrician, first class. Multiple bruises about body, none of any importance. Contusions over right chest and left back, apparently struck with a club, although patient thought it was a machete.

H. L. L., fireman, second class. Fractured skull. Large wound about 3 inches long over right parieto-occipital region; passes down in a glancing direction through all tables of skull, producing large depression. Made good recovery after operation. This case having been reported elsewhere in full, I shall not detail it here.

E. F. A., apprentice seaman. Contused wounds of left side of face and neck. Two in all; not serious.

A. T. B., ensign. Scalp wound of left parietal region extending from mid-line downward and forward for about 1½ inches. This is moderately contused, and apparently was made with the blunt edge of the instrument. Not serious.

H. T. S., electrician, first class. Lacerated wound over ankle and sprain of same. There was a slight wound of a contused nature over external malleolus about 1 inch long. Ankle was considerably swollen and a large subcutaneous hemorrhage was evident. This case also showed the effect of a blunt instrument.

Operation for plastic iritis.—While the U. S. S. *Tacoma* was at anchor off Great Corn Island, Nicaragua, on August 9, 1909, a native of that place came off to the ship with the many others seeking relief from their many and varied ailments.

H. W., age 37, negro, a laborer by occupation. Family history unknown. Patient states that he had variola when quite young, evidence of which is marked, and gonorrhea several years ago, but denies syphilis, although he appears syphilitic. As syphilis is so very common in these regions it is very doubtful if he has escaped. He also states that about a year ago he arose one morning with a severe neuralgia over the entire right side of his head and noticed that vision in the right eye was clouded and that this eye was sore; it hurt him to look toward the light; in fact he had difficulty in opening his eye and there was profuse lachrymation.

The pain over right side of head gradually subsided, but pain in eye increased. Patient now took to his bed, friends applied hot yams over the eye constantly, and he was able to be around in about ten days.

After patient had arisen from bed he found that he could hardly see out of his right eye, despite the fact that he felt much better. He states that this condition has become so marked in the past six months that he can not distinguish anything with the right eye.

Examination reveals a marked old plastic iritis of right eye. There is no pupil, and the center of iris is drawn slightly toward the upper corneal margin.

There is apparently no attachment to the anterior or posterior structures. Patient recognizes light, but not objects. Left eye is normal. The difficulties and dangers of the operative treatment of these lesions were fully explained to him, but as he wanted relief he insisted upon taking his chances with operative treatment.

The eye, after cleansing, was thoroughly anesthetized with 4 per cent cocaine, the eye speculum inserted, and fixation forceps grasped the lower inner quadrant of eyeball.

Standing behind patient, an incision with a von Graefe cataract knife was made from without inward through upper half of cornea. The center of iris was now grasped with iris forceps, lifted up, and a piece snipped off with scissors. When forceps were removed patient was found to have a new pupil, which was of a slightly irregular diamond shape. The ultimate result was satisfactory, and patient at once recognized objects held before him.

The eye was then washed out with boric acid solution and the lids closed. A compress of gauze coated with sterile vaseline was applied. After rest in bed he was allowed up in three days.

OSTEOMYELITIS FOLLOWING FRACTURE.

By Passed Asst. Surg. B. F. JENNESS, U. S. Navy.

The case was admitted to the U. S. Naval Hospital, Puget Sound, Wash., July 27, 1909, with a diagnosis of abscess, and was accompanied by the following immediate history: "Result of a blow received on the jaw July 5, 1909, while on liberty. One fractured tooth has been removed, but no evidence of fractured jaw has been present."

Examination on the day of admission to the hospital showed a discharge of pus from the cavity previously occupied by the last molar tooth of the left lower jaw.

A sinus was found extending to the bone, and a movable fragment could be felt but could not be removed without operation. This fragment of bone was the first evidence of fracture which had been noted in the case, but as the history, together with a careful examination, revealed no further evidence in the way of crepitus or abnormal mobility, the question of fracture was dismissed, temporarily at least, and the fragment was thought to be a molar root.

During this examination the patient's mouth could be opened but about 1 inch, further attempts causing pain in the region of the angle of the jaw. The jaw was swollen, extremely tender over the angle and along the body for a distance of 2 inches. Induration was marked, and the surface was hyperaemic in the region of the angle.

There was no fluctuation present. Pain, although not constant, was severe at times. Temperature on admission was 100° F.; pulse 80.

A few days later the fragment of bone mentioned was removed from the sinus in the alveolar process. The piece was taken from the outer side of the sinus, and was extracted with considerable difficulty. It was a fragment of jawbone, triangular in shape, about one-half inch in length and one-quarter inch in diameter at the base. It had been detached for a considerable length of time, imbedded in the soft tissues, and was not necrotic. Almost immediately after its removal patient could open his mouth sufficiently to admit two fingers. Comminuted fracture was now suspected to be the original injury, and search was made for other fragments without success.

August 3, drainage from the sinus was not good and the jaw was swelling and becoming more painful.

August 6, fluctuation was present just anterior to the angle of the jaw. A 1-inch incision was made, under cocaine anesthesia and about 1 ounce of pus removed. An area of exposed bone was found near the angle and considerable débris was removed by curettage; several fragments of bone were removed, but they appeared to be firm tissue from the cortex of the jaw rather than pieces of sequestrum.

The cavity was irrigated and the irrigating solution passed freely into the mouth. No line of fracture could be found, no sinus leading to the molar cavity could be located, and there was no crepitus present. It now seemed desirable to decide whether the original injury, resulting from the blow, was a comminuted fracture of the jaw or a marrow infection through the molar cavity from which the fractured tooth had been removed.

Sufficient time had not elapsed since the injury for an osteomyelitis to have reached the stage of regeneration of the bone marrow and to have converted the cortical layers into a sequestrum. Such destruction of the cortex must occur before an osteomyelitis, without fracture, could permit the passage of irrigating fluids through the entire bone; furthermore, the condition of the bone curetted did not verify the diagnosis of advanced osteomyelitis.

The removal of bone splinters, not necrotic, the sinus in the mouth, and the passage of fluids into the mouth from the external wound did, however, point to fracture as the original injury, and the presence of pus in the bone to an osteomyelitis in the acute stage.

August 18, a small pocket of pus near the external wound opened spontaneously into the sinus, some distance below the surface, forming a branching sinus, which led to bone near the angle. On the same date a fragment of bone was removed from the molar cavity. Drainage was now well established through tubes externally and the molar cavity in the mouth. Irrigating fluid passed through the external wound into the mouth at each dressing.

August 25, note was made that the jaw was swelling, despite apparently good drainage, and the patient complained of severe pain at night.

August 28, operation under ether. A 2-inch incision was made just anterior to the angle of the jaw. About an ounce of pus was removed and another sinus leading to dead bone was found. The incision was enlarged, and for a distance of 2 inches anterior to the sinus there was necrotic bone with considerable destruction of tissue. Several pieces of bone were removed, the jaw was thoroughly curetted, and drainage established.

September 15, three fragments of bone were removed from the external sinus.

October 25. A radiograph (see plate), made this day, showed evidence of fracture which had extended through the angle of the jaw; there was also shown an area of necrotic bone near the external border and considerable destruction of marrow tissue.

November 9, one fragment of bone was removed from the external wound. About this date fluid ceased to pass into the mouth from the external sinuses. These sinuses no longer required drainage tubes and were closing rapidly.

About December 1 the sinuses were completely closed and there was no discharge of pus from the mouth.

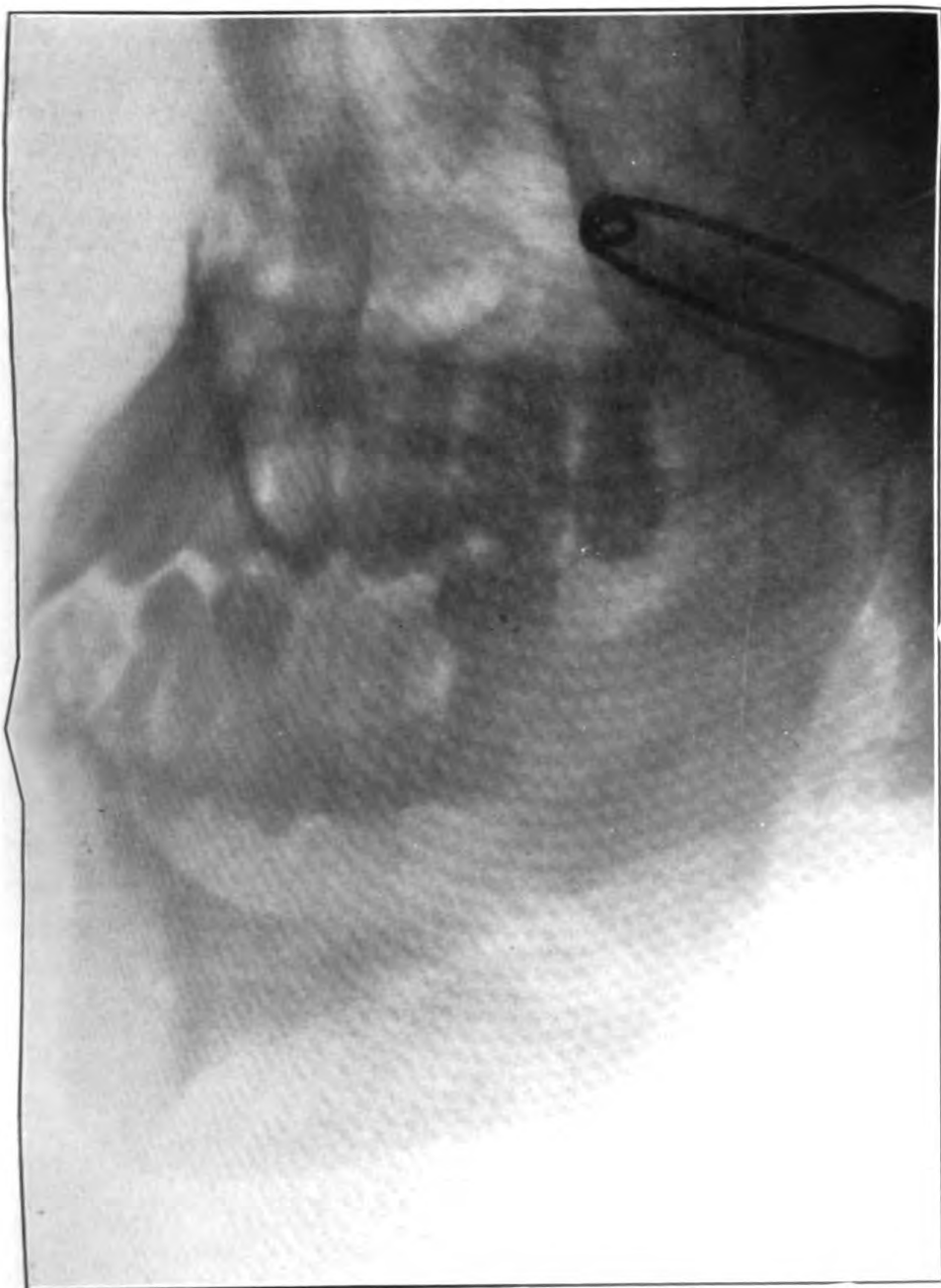
At the date of present writing the sinuses remain healed. Nine fragments of bone have been removed from the case since his admission to the hospital and three separate sinuses leading to the jaw have been opened. The left side of the jaw shows some deformity from loss of bone tissue; a partial sensory paralysis of the left half of the lower lip exists; when pressure is made in the molar cavity the patient complains of the sensation of electric shock passing through the lip; the patient remains in the hospital for tonic treatment.

A CASE OF APPENDICOSTOMY.

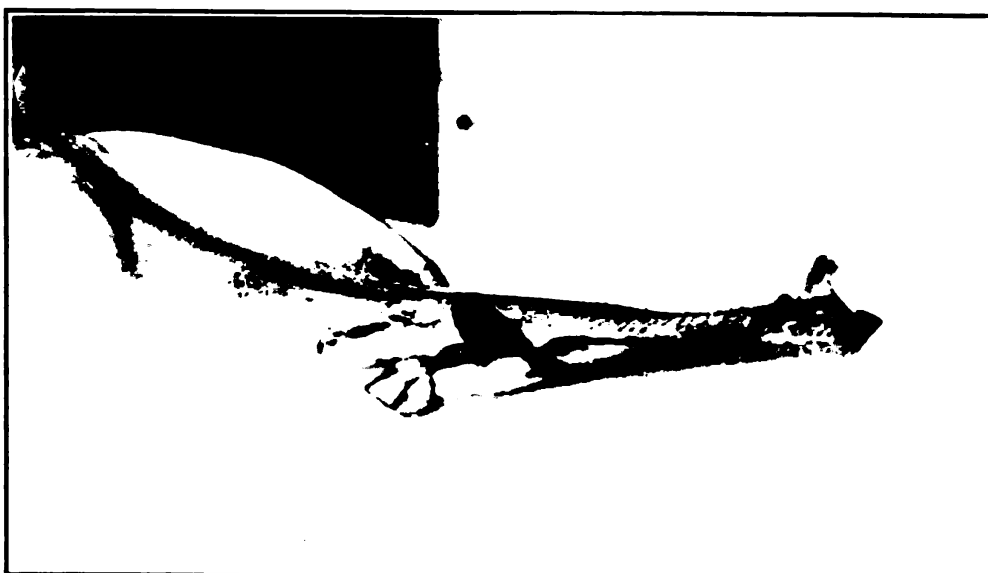
By SURG. RAYMOND SPEAR, U. S. NAVY.

The patient, P. M., aged 27 years, contracted amœbic dysentery while attached to the legation guard in China in November, 1908. He was invalided home and admitted to the United States Naval Medical School Hospital in Washington, D. C., on February 18, 1909.

The man steadily lost weight and strength, and in spite of treatment, which consisted of rest, diet, and colonic irrigations of solutions of quinine, sulphate of copper, and the silver salts, and repeated trials of ipecac, the course of his disease was progressing steadily onward toward a fatal termination. The stools averaged during



OSTEOMYELITIS FOLLOWING FRACTURE.



APPENDICOSTOMY. PHOTOGRAPH TAKEN BEFORE REMOVAL OF APPENDIX.

this time from fifteen to twenty during the day, and at all times contained mucus and occasionally some blood. The stools were soft and contained large numbers of motile amœbæ.

On July 5 an appendicostomy was performed. The abdomen was opened through an intermuscular incision over the appendix. The cæcum and ascending colon were thickened and indurated, and showed clearly by the amount of fibrous tissue that deep ulcerations had taken place in the mucosa and muscular layers of the intestine. The peritoneal coat was discolored and whitened in many places from inflammatory reaction.

The appendix was free, but its walls were thickened to about four times their normal diameter. The mucosa of the appendix had been involved by the ulcerative process that had occurred in the colon. According to Musgrave and Strong, of Manila, this condition is to be expected in 14 per cent of the cases of amœbiasis.

The appendix with its meso-appendix was drawn out of the abdomen without twisting the cæcum and without tension, the serous coat of the cæcum, well free of the base of the appendix, was secured to the parietal peritoneum by a continuous suture of catgut; care was taken not to constrict any blood vessels of the meso-appendix. The photograph shows the well-nourished thickened red appendix protruding from the abdomen as well as the dried stay sutures.

Four days after the operation the appendix was cut off, leaving a small projection to allow for contraction. The blood supply was so free that it was necessary to ligate two bleeding points. Irrigation of the colon was started immediately; the stools were reduced in number, became partially formed soon after the operation, and the man's health improved visibly.

He was discharged from this hospital September 29, 1909, and was advised to continue his irrigations until all symptoms subsided and not allow his fistula to close.

A letter written from Wisconsin six months after operation stated that he had gained 20 pounds in weight, could eat anything, was regaining his old vigor, and was very hopeful of being completely cured. Amœbæ however being still present in his stools, he was keeping up his irrigations, which he himself administered by simply introducing a small rubber catheter into his colon when he went to stool.

This case shows the importance of always disposing of the appendix when it is involved. If the appendix in this case had not been free and movable its removal would have been indicated at the time of the cecostomy.

REPORT OF THREE CASES FROM THE U. S. S. RELIEF.

By Surg. A. W. DUNBAR, U. S. Navy.

Case 1.—Varicocele (operation), neurasthenia, diabetes mellitus.

R. E. N., yeoman, second class, age 24 years, white, native of Kentucky. Admitted May 11, 1909, from U. S. S. *Mohican* with varicocele, causing pain and "dragging" sensation; high operation performed under ether; discharged to duty May 22. Admitted to hospital July 1 as with neurasthenia, complaining of headache, weakness, excessive thirst, polyuria; quite emaciated, being 20 pounds under weight; discharged July 16, 1909, for readmission with diabetes mellitus; urine passed 8,000 c. c. per diem; specific gravity, 1.034; sugar, $2\frac{1}{2}$ per cent. Improved under opium and codeine and restriction of carbo-hydrates; gaining in weight; urine reduced in amount, specific gravity, 1.027; sugar, 0.9 per cent. Transferred to Naval Hospital, Mare Island, Cal.

This case is of interest by reason of the possible cause being administration of ether, at which time the urine was reported to be negative.

Case 2.—Febris typhoides.

A. M., private marine, age 23 years, white, native of Tennessee. Recently arrived with draft on U. S. S. *Buffalo* from Marine Barracks, Mare Island, Cal. Admitted July 28, 1909, from naval station, Olongapo, P. I., as with pyrexia ortus incerti; symptoms were headache, irritable stomach, and diarrhea. Temperature, 104° F.; pulse, 94; respirations, 30. Rapidly became worse with low delirium, severe diarrhea, and cough; sputum showed numerous pneumococci; consolidation at base of both lungs. Diagnosis changed to febris pneumonica July 31; patient failing with marked mental hebetude, subsultus tendinum, respirations 40 per minute and high fever. Enteric fever was suspected, but Widal's reaction continued negative until just prior to death, August 4, when it appeared fairly positive; he was then admitted with febris typhoides for record.

Autopsy: Consolidation right lower lobe, hypostatic congestion left. Brain shows general pachy-meningitis. Abdomen: ileum one mass of typhoid ulcers, some having eroded through, openings sealed by fibrin. General peritonitis.

The source of infection is undetermined, this disease being rare in this locality. A typhoid "carrier" on the *Buffalo* or at barracks was suspected, but no other evidence of this was found. No further cases have developed in draft.

Case 3.—Intestinal obstruction.

T. A., coxswain, age 26, American. Admitted from U. S. S. *Chauncey* with tentative diagnosis of "febris enterica." History of general abdominal cramps and tenderness; no rigidity; anorexia

but no vomiting; headache, pains in back and legs; fever, 99° to 102° F. Widal test negative; no malarial organisms found. Temperature, 99° to 104°. No splenic enlargement. After admission above symptoms persisted and vomiting of gastric contents occurred. Bowels open.

February 17, 1909. Given quinine gm. 4 hypodermically. Temperature fell to normal and above symptoms ceased. Diagnosis of malaria made upon therapeutic grounds, and improvement continued under quinine. Had slight irregular fever and mild abdominal cramps; no vomiting.

April 20. Secondary syphilis developed, initial lesion at meatus; general glandular eruption; macular and pustular eruption. Quinine stopped and antisyphilitic treatment administered.

May 3. Seized with agonizing general abdominal colic, vomiting, obstinate constipation. Temperature, normal; pulse, 100, good tone. Abdomen slightly distended; active peristalsis over upper abdomen.

May 4. Colic continued and obstipation complete. Slight distension and general tenderness; no rigidity. Vomit at 1 p. m. slightly bile-tinged, at 10 p. m. feculent odor detected; pulse more rapid and "snappy." Diagnosis of intestinal obstruction made. Operation 11 p. m. under ether. Incision (5 inches) through right rectus, one-third below and two-thirds above level of umbilicus. Large amount serous fluid in peritoneal cavity. Omentum adherent below. Small intestine (jejunum) congested and distended for about 3 feet from duodenum, where constriction due to kinking and volvulus by several old and many new fibrous bands extending between folds of the mesentery in upper right quadrant of abdominal cavity was found. Adhesions were broken up and ligated off. Bowel, where constricted, was ecchymotic but soon improved in appearance and peristalsis commenced. Dry toilet of peritoneum was made and incision closed without drainage. The gall bladder was empty and apparently normal and no cause for the dense adhesions was found. Convalescence was rapid and uneventful. Discharged to duty June 14, to continue antisyphilitic treatment.

A CASE OF LANDRY'S PARALYSIS.

By Asst. Surg. H. L. KELLEY, U. S. Navy.

A case of "Landry's paralysis," paralysis ascendens acuta, was admitted and may be of general interest. An ordinary seaman, 19 years of age, strong and healthy before present illness, first complained of pains in his neck and numbness of fingers and hands. The day following he reported that his feet were numb, and it was found that he had considerable difficulty in walking without support, his

legs being weak and unsteady. The patella reflex was absent in both legs; Romberg's symptom was marked; Beninsky's reflex was not obtained. Sensation was everywhere normal except that he said it felt as if he had "springs in his feet." After the first day he did not complain of any pain.

The patient was transferred to the United States Naval Hospital, Canacao, on the third day after first report. At the hospital the condition became progressively worse, complete paralysis of legs came on, the arms became affected, and the night before he died he had considerable difficulty in articulating clearly; the muscles of deglutition were involved, and finally respiratory paralysis, coma, and death followed on the twelfth day after initial symptoms.

Autopsy showed little except a few rather firm adhesions between the brain and dura mater. The spinal sheath contained considerable clear fluid. The spleen was about two and one-half times the normal size. The other organs showed no special abnormality. The spinal cord showed nothing abnormal macroscopically.

The culture from spinal fluid showed no organisms. The pathological specimens are preserved at the United States Naval Laboratory, Canacao, P. I., awaiting microscopical section. This case is cited because it is believed that "Landry's paralysis" is not of frequent occurrence in the service.

*Independent Report from United States Naval Hospital,
Canacao, P. I.*

By Passed Asst. Surg. J. A. RANDALL, U. S. Navy.

Z. ordinary seaman, age 19 years, was admitted to the hospital July 31, 1909, with paraplegia.

Family history negative, except that one brother, still alive, suffers from some nervous affection.

Past history: No history of any acute disease nor of any trouble in feet or legs. No history of syphilis. Does not use alcohol.

Present history: Attack began about ten days previous to admission to this hospital. Patient first noticed numbness and weakness in fingers, hands, and legs. Has had no pain. When admitted could not walk or stand alone. On walking with assistance, drags toes. Patient is well nourished, and there is no wasting of any group of muscles. Hands and arms are much less affected than legs, but there is some incoordination in hands. Can not perform fine movements with fingers, such as buttoning his shirt.

Tendon reflexes totally absent; cutaneous sensation (pain, heat, and tactile). normal; stereognostic sense slightly diminished; no anæsthetic areas or œdema; no involvement of bladder or rectum; muscles respond normally to faradic current.

From the time of admission the paralysis of lower extremities progressed until the fourth day, when there was complete paralysis. At this time the incoordination of hands was much more marked, although he could still use his hands; he then began to complain of some difficulty in swallowing his food, and had to be fed with feeding cup.

From this time on the condition rapidly progressed; paralysis of arms increased until it became total. It became necessary to resort to the stomach tube for feeding, on account of the dysphagia.

On the tenth day there was paralysis of lips. Patient could not articulate distinctly.

On the eleventh day all these symptoms were more marked, and, in addition, signs of paralysis of respiratory muscles began. Respiration soon became very labored, until finally there was complete paralysis of the diaphragm and death ensued.

Autopsy showed no gross lesions except an enlarged spleen. Sections of cervical, dorsal, and lumbar cords showed no degenerative changes.

HEAT EXHAUSTION ON THE U. S. S. COLORADO.

By Surg. J. T. KENNEDY, U. S. Navy.

On September 5, 1909, the Pacific Squadron left San Francisco, Cal., for Honolulu at standard speed of 18 knots. This ship had received aboard a draft of recruits just before sailing and almost from the first sickness and trouble were experienced in the fireroom.

During the second day's run cases of cramps in the stomach began to appear, followed during the next twenty-four hours by cases of cramps in arms and legs and heat exhaustion. The sick bay was besieged by sufferers and the hospital force kept busy with stretchers removing the exhausted from the fireroom.

The deck force was now called upon to supply the vacancies in the fireroom and bunkers, and as no selection was made of men physically suitable, many of these promptly succumbed and swelled the list in the sick bay. As many of these cases were terror-stricken malingerers, little sympathy was shown beyond prescribing a nerve stimulant and they resumed duty in the bunkers or were excused to do duty on deck. Seasickness, indigestion, and ice water, the usual initiation of recruits to fireroom duty, were the causes producing cramps in stomach. Twenty-four cases were noted for record, nearly all recruits. Only a few seasoned men complained and they knew just what they wanted. On receiving it they returned to their duty. Some thirty-seven cases of cramps in arms and legs were treated and recorded. These men rarely had other symptoms and their condition could be attributed to exhaustion of muscles, unprepared for

such severe demand. Many of these men were attempting to do the work of two and three, owing to the shirking and falling out of weaklings, but the shovels and slice bars would finally drop from their hands, the leg muscles contract in painful spasms, and the men collapse on the deck. Rest and massage restored these cases rapidly and without consequences.

Heat exhaustion claimed as victims twelve coal passers, two firemen, and six of the deck force. Nearly all were recruits and many physically impossible for sustained duty in a fireroom.

There had been no sickness or prolonged cruising to depress their vitality; the temperature was only the average, i. e., 120° F., and even this was modified by forced draft and a low relative humidity, so that heat exhaustion like seasickness would seem to be the expression of a body seeking to adjust itself to an environment, the symptoms resulting from the temporary lack of adjustment. The symptoms varied little from the classical description repeatedly recorded. Syncope, more or less profound, marked the onset, the man silently collapsing at his post and being immediately, with difficulty, removed to the sick bay. Frequently patients were conscious on arrival and vomited. The pulse was small, soft, and rapid; temperature subnormal; breathing shallow, never stertorous; skin cold: cramps appeared in legs and in a few cases in the body and arms. These cramps were always subjective and in no case were tetanic spasms noticed. The attack disappeared as suddenly as it came, and since that time no cases have appeared, although the ship has sailed under worse conditions of heat and oppression, coaling has gone on under burning skies, and fatigue and depression incident to hard work and little play has been the rule.

Treatment.—Incident to the first appearance of cramps the ice machine was partially disconnected from the scuttle butt and slightly cooled water substituted for the deadly frigid article. This should have been done sooner in order to prevent fools and innocents destroying their usefulness.

During the adjustment of men in the fireroom to this abnormal condition of heat and perspiration constipation is the rule. The rapid elimination of water through the skin leaves little to pass through the kidneys and the faecal residue is dessicated into firm masses. A cathartic of calomel and compound licorice powder was given to every case and an additional enema to each case of prostration. The resulting faecal returns were highly instructive as to the capacity of the rectum. Rarely was morphine required to relieve painful cramps. The men returned to duty on recovery with nothing worse than headache and weakness. In making an investigation of the fireroom personnel it was found that 75 of the 90 coal passers had enlisted as apprentice seamen and many of these were boys under 21.

At the training stations they had then changed their rating, either voluntarily or otherwise, but no examinations had been made to see if they conformed to the physical requirements designed for coal passers.

Case report.—Among the cases of heat prostration occurring on this ship the case of J. M. H., coal passer, presents some features of interest. This man was a recent recruit taking his first view of salt water as the ship sailed on the cruise to Honolulu.

He was large, strong, and apparently well fitted for his rating. The second day out, at midnight, he was overcome by heat in the coal bunker, brought to the sick bay, and treated. Syncope lasted only fifteen minutes. As consciousness returned he complained of dyspnoea with cardiac pain. The pulse was rapid and irregular and he was mentally dull. The next day he was free from all symptoms except rapid irregular pulse and some shortness of breath. The condition persisted with no discoverable cardiac lesion and remained unchanged by cardiac stimulants. He was relieved from duty and kept in the open air.

As the launch was leaving the ship early on the morning of the 11th the coxswain observed the top of a man's head floating in the water near the after gangway. He secured the body and removed it on deck, where the medical officer discovered signs of life and succeeded in resuscitating him. He was recognized as J. M. H. On regaining consciousness he stated that he had no knowledge how he came to be in the water, but surmised that he had fainted while vomiting and fallen overboard. Pulmonary congestion with high temperature ensued, but resolved in forty-eight hours, leaving the same condition of cardiac irregularity and increased mental depression, amounting to a mild degree of melancholia. He was surveyed a few days later and returned to the United States.

TWO CASES OF MILD HEAT EXHAUSTION ON THE U. S. S. CHARLESTON.

By Medical Inspector OLIVER DIEHL, U. S. Navy.

Case 1.—O., fireman, second class, American, white, age 28 years 10 months. On Jan. 6, 1909, while the ship was en route from Sandaken, Borneo, to Manila, P. I., the patient lost consciousness while at work in one of the firerooms. He recovered consciousness in a few minutes and was taken to the sick bay. When examined he was perspiring freely, pupils were dilated, and the pulse was soft and accelerated. There was no tendency to convulsions or muscular cramps. There was slight prostration, but he regained his normal condition rapidly and returned to duty on the following day.

On the day of the attack the work of the firerooms was somewhat unusual, owing to the fact that a speed trial was in progress, and it was the first day that the patient had worked on the fires for some months. The temperature of the firerooms was 115° F. The patient stated that he had perspired very little before he lost consciousness.

Case 2.—R., coal passer, American, white, age 19 years 9 months. On Jan. 7, 1909, while the ship was steaming under ordinary conditions near Manila, P. I., this man lost consciousness and fell to the fireroom deck. He recovered in a few minutes and was taken to the sick bay. On examination he complained of a severe pain and a sense of oppression over the anterior portion of the chest. There was little exhaustion and no circulatory or respiratory embarrassment was noted. The pain persisted for one day, and in two days he returned to duty. The temperature of the fireroom was 116° F.

The cases noted above represent the mildest form of exhaustion seen in the firerooms of naval vessels. The chief symptom is syncope followed by more or less weakness. They can scarcely be regarded as cases of heat exhaustion in the accepted meaning of the term. These two were the only cases on record during the year 1909.

BOLO WOUND INVOLVING THE BRAIN.

By Passed Asst. Surg. C. F. ELY, U. S. Navy.

On September 5, 1909, about 2 p. m., a Filipino was admitted to sick quarters suffering from the following injuries: Bolo cut extending from left supra-orbital arch to squamous portion left temporal bone, describing arch 6½ inches in length. Examination disclosed a compound fracture of skull, the weapon having passed through all superficial structures, skull, membranes, and brain to a depth of about half an inch. In addition there was a compound fracture of left humerus at juncture of upper and middle thirds. The man was conscious and stated he had received the injuries about 7 a. m. the same day, his assailant having attacked him while he was asleep. He laid where he was for several hours, until discovered by a native policeman, and then walked about 4 miles to the hospital. When admitted he was in fairly good condition, barring weakness from loss of blood, which was considerable. The head was thoroughly cleansed, scalp shaved and disinfected as completely as possible, and the parts were united by means of deep silkworm gut sutures extending through all superficial structures down to the skull. Drainage was secured by inserting gauze wicks at the anterior and posterior extremities of the wound, and an incision over the left malar bone extending down to the skull. Copious dressings were applied to the head and held in



GOUNDOU AND LEONTIASIS.

place by a firm bandage. The wound in the arm was then thoroughly cleansed, disinfected, partly sutured, drainage applied, and the fractured parts immobilized by means of splints. Patient was then placed in bed and stimulants administered; he soon reacted and barring a temperature which, fluctuating between normal and 102° F., lasted for four days, and a stubborn tightness of the bowels which resisted all remedial measures for five days, his condition was at no time alarming. Bowels finally responded to repeated doses of magnesium sulphate. No anesthetic was administered during operation owing to patient's weakened condition. He was discharged September 30, 1909, practically well, the fractured parts of left humerus being in good line and apposition.

A CASE OF GOUNDOU WITH COEXISTING LEONTIASIS.

(From Puerto Cortes, Spanish Honduras.)

By Passed Asst. Surg. I. S. K. REEVES, U. S. Navy.

At Puerto Cortes, Spanish Honduras, through the kindness of Doctor Austin, I obtained an opportunity to study the following case:

The patient, a negress 58 years of age, was born in Belize, British Honduras, where she lived until 1901 when she moved to Puerto Cortes. During her married life of thirty-one years she has given birth to one stillborn child and to six living children who have had only the usual diseases of childhood. She had no illness until her fiftieth year, when the first signs of leontiasis and goundou appeared. There was leontiasis of the cranial and superior maxillary bones; the malars and inferior maxillary were normal. The lower teeth were in fair condition, the upper except the canines, had been lost during the period of development of osseous disease.

The hypertrophy of the nasal process of the superior maxillary (goundou) is clearly shown by the accompanying photograph, and was out of all proportion to that due to leontiasis found in other parts of the skull. The cartilages of the nares were not involved, though the mucous membranes showed thickening, and the nasal ducts were not patent. The skin is not involved in the hypertrophy and is freely movable over the tumors.

The leontiasis of the frontal, parietal, and occipital bones appeared eight years ago and at present the skull measures about 28 inches in circumference. About six months after the "swelling of the head" was first noticed the bilateral swellings of goundou appeared and its development on the right side was the more rapid. Profuse lachrymation and severe cephalalgia accompanied the gradual increase in

the nasal tumors and the nasal ducts were evidently obliterated at this time. The tumors themselves have never been painful; they attained their present size within the first year and the cephalalgia then subsided. A sero-purulent discharge from the nose appeared with the onset of the disease and ceased at the end of six months. At present she suffers from attacks of cardiac palpitation and vertigo when exposed to the direct rays of the sun. Excepting the conditions above mentioned the patient is normal.

In this case the fact that the leontiasis is symmetrical while the characteristic goundou swellings are asymmetrical would appear to indicate that their development in the same patient is merely a coincidence.

**SEVERE RUPIAL ERUPTION APPEARING AS ONE OF THE FIRST SYMPTOMS
AND THE ONLY ERUPTION IN A CASE OF SECONDARY SYPHILIS.**

By Passed Asst. Surg. R. R. RICHARDSON, U. S. Navy.

T. T. C., ordinary seaman.—Patient was admitted to hospital from U. S. S. *Maine* on August 16, as with "Adenitis inguinalis" (right). According to hospital ticket, "venereal disease. Sequel of an ulcer on prepuce. Glands in right groin infected and suppuration threatened." Sore on penis healed in one week after admission to hospital. On September 1 (two weeks after admission) glands in right groin were suppurating, so they were enucleated. About one week later mucous patches were discovered covering both tonsils and extending onto soft palate (patient could swallow only liquids), and a rupial eruption appeared on face, back, arms, and legs. Sores on face and back varied in size from a pea to a 10-cent piece in diameter. It was a true rupial eruption. Mercury (internally both by mouth and hypodermatically) was pushed until patient was thoroughly salivated; it was then discontinued and he was placed on potassium iodide in increasing doses. Mucous patches on tonsils and soft palate were touched with a 10 per cent solution of silver nitrate daily, and mouth wash and gargle of "yellow wash" was used three times a day; crusts were removed from sores on face, body, and limbs; sores touched with pure carbolic acid and dusted with calomel. Patient stated that he had been exposed in Norfolk, Va., during the first week in July. Sore appeared on under surface of prepuce one month later. He denies ever having had any sore or other venereal trouble prior to this time. On September 23, mucous patches on tonsils and palate had nearly disappeared and patient could swallow freely; eruption on face and body was drying up; potassium iodide, 60 grains daily, and local treatment to eruption was continued. September 30, mucous patches on tonsils and palate had entirely disappeared; erup-

tion was nearly dry; potassium iodide, 90 grains daily; patient up and around; wound in groin entirely healed. October 14, eruption has entirely dried, leaving pits and scars on face, back, and limbs where eruption was most severe.

October 21, convalescent; placed on general tonic treatment; potassium iodide discontinued. November 15, a few sores have broken out on legs; placed on potassium iodide, 60 grains daily, internally, with local treatment to sores; general condition excellent. November 30, sores are about healed. December 16, discharged to duty; no open lesions or active manifestations of disease now present.

This case was one of malignant syphilis and showed the inefficiency of mercury in these precocious cases and the remarkable effect upon them of potassium iodide in large and continuous doses.

OPERATIONS FOR SUPPURATIVE EAR DISEASE.

(From the U. S. S. *Connecticut*.)

By Asst. Surg. R. W. McDOWELL, U. S. Navy.

1. L. J. L., ordinary seaman, on June 16, 1909, first noticed pain in ear, accompanied by discharge of pus from external auditory meatus. Patient also had a severe tonsillitis. Under appropriate local treatment the ear symptoms subsided, to reappear on July 12 with increased severity, accompanied by high fever, vomiting, mental dullness, and severe tenderness and pain over the mastoid region. On July 17, under ether anesthesia, mastoid was opened and a small amount of inspissated pus removed. The bone of the mastoid antrum was necrotic and upon removal by curette a small amount of pus was discovered on the dura. This was removed, and no further signs of pus detected. Boric acid solution irrigation, iodoform gauze drainage, and closure. Patient reacted well after operation, and temperature fell to 100° F., pulse excellent. As ship was noisy and in the midst of target practice preparation, his condition being much better, he was transferred to the United States Naval Hospital, Boston, Mass.

2. W. C. F., ordinary seaman, had been complaining of pain around ear for eight days. There was tenderness and slight redness over the mastoid, headache, vomiting, and fever. There was a history of chronic discharge from ear, which had suddenly stopped four days before. On August 10, 1909, under ether anesthesia, a typical mastoid operation (right side) was performed. The necrotic bone was curetted, pus found in mastoid antrum, and cells removed, area disinfected, iodoform drainage used, and wound closed. On September 9 wound is healed, and there is no discharge from the ear.

NOTES OF TWO SURGICAL CASES.

(From U. S. Naval Hospital, Canacao, P. I.)

By Surg. H. C. CURL, U. S. NAVY.

Vesical calculus.—A Filipino, Felician Tobin, 62 years of age, presented himself at this hospital October 15, 1909, complaining of pain in lower abdomen and pelvis, not very severe but of long standing.

Examination per rectum gave the impression of a very much hypertrophied and very hard prostate, but the sound demonstrated a stone large enough to prevent entrance into the bladder.

By suprapubic route a stone (see illustration) was removed which weighed $12\frac{1}{2}$ ounces avoirdupois; was $3\frac{3}{4}$ by $2\frac{1}{2}$ by 2 inches. Recovery was slow but uneventful.

Knife blade in foot.—Seven months ago Santiago Hil, a Filipino, 19 years of age, stepped on an open pocketknife, the blade of which broke off in his foot. The blade had penetrated between the first and second metatarsals, splitting off a portion of the second.

The patient had been walking and doing light work for six months when he presented himself for examination. The blade when removed was found to be about 2 inches long, very sharp at the point, and firmly surrounded by fibrous tissue. Its apparent length in the radiograph is due to foreshortening from the oblique angle of its position in the tissues.

The point of interest in this case is the length of time the foot had been used with this comparatively large foreign body in it.

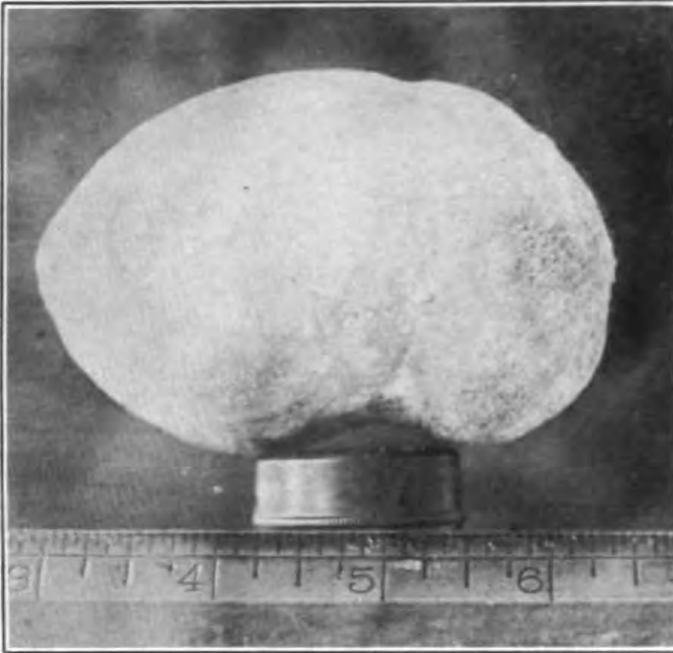
NOTE ON CASES OF FEVER AT PICHILINQUE BAY, MEXICO.

(Extracts from Sanitary Report of U. S. S. *Buffalo*, 1909.)

By Passed Asst. Surg. J. L. NEILSON, U. S. Navy.

At Pichilinqué Bay, Mexico, four cases of fever developed, known in that region as "calentura" (simply the Spanish word for fever). From the very small opportunity for study, the following facts were obtained by observation and from the local doctors:

Its etiology is not known. Mosquitoes are suspected by the doctors of La Paz (probably because mosquitoes are being accused of carrying fevers, for there was no evidence that such was the case). The incubation period is about ten days, for that is the usual time for new arrivals to be attacked after landing. The first symptoms are chills, malaise, a tendency to vomit or actual vomiting. The temperature rises rapidly to 103° or 105° F., where it stays one day, dropping gradually to 99° or 100° F. on the third day of the disease, only to rise again after this one-day drop. The second rise lasts a little longer than the first and the fever falls by lysis. As the tem-



VESICAL CALCULUS— $12\frac{1}{2}$ OUNCES. ($\frac{3}{4}$ NATURAL SIZE.)



KNIFE BLADE IN FOOT.

perature comes on severe pains in head, back, and joints develop, and as it falls a rash appears, dusky to purplish in hue, the spots being one-fourth to 2 inches in diameter; this disappears on pressure and is found mostly on the trunk. There is no hemorrhagic tendency. Albuminuria starts late and continues well into convalescence, which is slow, as all patients are greatly weakened. The treatment ashore consists in severe purging with calomel and large doses of quinine.

As the disease is most like dengue, it is so called in the records of the ship. Blood examinations were impossible, as there is no microscope on board at the present time.

A CASE OF NEUROSIS HYSTEROIDES.

By Passed Asst. Surg. E. C. WHITE, U. S. Navy.

The following case is reported because of the unusual train of nervous symptoms, particularly the unusually high temperature:

The patient, C. B., apprentice seaman, age 18, native of Indiana, was admitted to the Naval Hospital, Newport, R. I., from the training station, at 5 p. m. on August 31. He had been under treatment for four or five days for a severe attack of bronchitis, but his temperature at noon August 31 was normal. About 4 p. m. his condition suddenly became as follows: Breathing, a noisy dyspnea, ceasing at irregular intervals for spaces of several seconds; heart's action irregular and very rapid; somewhat cyanotic; unconscious, and could not be aroused.

On admission to the hospital he was having tonic convulsions at irregular intervals, opisthotonus being very marked during the convulsions, which continued until about 6 p. m. and then ceased permanently. Oxygen and stimulants were administered, and in an effort to arrive at a diagnosis blood, urine, and cerebro-spinal fluid were examined and all found negative, except that the specific gravity of the urine was rather high, 1.030.

His eyes seemed to follow the attendant, but he showed no other sign of consciousness. Reflexes normal except that Kernig's sign was present in a slight degree. At 5.30 p. m. his rectal temperature was 106.2° F., pulse 145, respirations 100. At 7 p. m. rectal temperature was 108.2°, pulse 144, respirations 76. During an ice bath he showed his displeasure by making faces and crying out.

Temperature dropped to 104° in a few minutes and at 8.15 p. m. was 102°, having fallen 6.2° in an hour and a quarter. Pulse was then 120, respirations 40. During the night his temperature dropped further to 101° (pulse 88, respirations 38), and continued at about that point for several days, until the bronchitis disappeared. During the first night he rested easily except for the coughing spells. The following morning he was very irritable, resisting angrily every

attempt to examine him. Replies to questions were incoherent, and his manner was very nervous.

By the second morning, September 2, he was perfectly rational except for the irritability of temper, and the following facts were learned by questioning him: His father uses alcohol to excess and is separated from his mother, who is healthy and not nervous; ten years ago he lived in a "home" for fourteen months, and since that time has worked on a farm; while at the "home" he saw several boys have fits; he is a poor sleeper, has a quick temper, but always got along very well with his playmates; denies all venereal history and masturbation; is subject to frontal headaches; last summer he was ill for three weeks and during that time was very restless and could not stay in bed; he has a hazy recollection of what happened to him the day he came to this hospital; answers nervously and starts at every sound; has a tender spot in lumbar region of spine and hyperesthesia over entire skin area, most marked on the sole of the left foot.

At 2 a. m. September 3 he became suddenly excited and broke away from a patient who was watching him and attacked another; he was quieted, but a half hour later attempted to jump from a window, after which he shouted and cried for a time before going to sleep.

In the morning he explained that he was trying to escape a crowd which wanted to kill him. He had illusions, delusions, and hallucinations, picking articles of food off the wall, finding sputum cups in the blankets, etc.

The following day, September 4, patient was entirely sane, but nervous, and showed no other marked nervous symptoms during his continuance under observation, which was until September 15, when he was surveyed from the service as with neurosis hysteroides.

VARIX OF BOTH SUPERFICIAL EPIGASTRIC VEINS.

By Passed Asst. Surg. R. R. RICHARDSON, U. S. Navy.

C. A. N., private marine. According to hospital ticket: "Condition, probably in lesser degree, existed prior to enlistment, as descriptive list shows 'prominent veins' above and around pubis." Examination upon admission to hospital showed a large varicosity (the size of a hazelnut) of each superficial epigastric vein, situated in each groin, together with dilatation of superficial veins over pubis and lower part of abdomen. Incisions were made over the varicosities in each groin, ligatures placed above and below the varicosities, which were dissected out and excised. Wounds were sutured and healed by first intention. Afterwards enlarged veins over pubis and lower part of abdomen were scarcely discernible. Patient suffered no inconvenience whatever after the operation.

步, 龍鳳呈祥
五福臨門

Year Ending December 31, 19 09.

1. The report will include all major operations and will be kept constantly posted up to date that complete data may be available for the Bureau's information at any time.

Original from
HARVARD UNIVERSITY

days each year. If, in a rough attempt to give this loss a money value, we assume the average daily pay, based on appropriation, navy pay, to be about \$1 we find that an average of \$34,295 has been expended yearly for which the Government has received no return. (This figure does not include cost of hospital or other treatment, but is the pay of unproductive labor.)

The great damage produced by syphilis is not alone due to the large number of cases, but to the additional fact that the cases have a long average period of treatment. (Column 8.) This is easily explained if we remember that the patient is isolated and observed during the first stage and isolated and treated during the second stage. When isolation is no longer necessary the patient returns to duty and although, perhaps, continuing treatment usually does not contribute more sick days. From the table (columns 10 and 11) we see that, for each day the average length of treatment is reduced, we return an average of 464 men to duty for one day and avoid the unproductive expenditure of \$464. Moreover, we note that only 17.4 per cent (column 5) of the cases were diagnosed from the primary sore and a large per cent must have been carried under other diagnoses while under observation for secondary lesions.

STATISTICS FROM MEDICAL INSPECTOR GATEWOOD'S NAVAL HYGIENE.

Year.	1	2	3	4	5	6	7	8	9	10	11
	Average strength.	Admission rate.	Total admissions for syphilis.	Admissions for primary syphilis.	Per cent primary syphilis to cases of syphilis consecutive.	Per cent damage.	Sick days.	Average sick days per case.	Number of men incapacitated for one day per year or cost of syphilis at average pay of \$1 per day.	Number of men returned to duty for one day for each day that average duration of treatment is reduced.	Amount saved for each day that average duration of treatment is reduced.
1895.....	13,191	14.8	195	43	22.4	0.2970	14,300	73.32	14,300	195	\$195
1896.....	14,196	14.0	199	40	20.1	.2745	14,223	71.57	14,223	199	199
1897.....	15,734	12.4	195	55	28.2	.2910	16,712	85.70	16,712	195	195
1899.....	20,819	15.5	323	84	26.0	.3155	23,975	74.22	23,975	323	323
1900.....	23,756	16.2	385	80	20.0	.4080	35,378	91.99	35,378	385	385
1901.....	26,873	17.4	468	78	16.6	.3600	35,311	75.50	35,311	468	468
1902.....	31,240	16.7	522	83	15.9	.3055	34,835	66.73	34,835	522	522
1903.....	37,248	19.6	730	85	11.6	.4280	58,189	79.72	58,189	730	730
1904.....	40,555	18.8	762	118	15.5	.3720	55,066	72.37	55,066	762	762
1905.....	41,313	20.3	838	141	16.8	.3645	54,964	65.54	54,964	838	838
Average.....	26,492.5	17.5	464	80.7	17.4	.3640	34,295	73.90	34,295	464	464

NOTE. —1905 is substituted for 1908, since the navy was on a war footing in the latter year.

CURRENT COMMENT.

It is to be remembered that in the publication of these comments the bureau does not necessarily undertake to indorse the opinions expressed, but will lend the pages of this section to discussion of such contemporary topics as will be of interest and value to the service.

REPORTS OF SURGICAL OPERATIONS.

Lack of uniformity and neatness in the adequate but concise rendering of the "Report of operations" from various sources has prompted the bureau to include the accompanying plates which well illustrate what is desired in the preparation of this form.

Opinion will naturally vary as to what properly constitutes a minor operation, and the operative relief of the same condition may, of course, be minor or major in its degree. Criticism may be directed at lack of uniformity in the nomenclature, but in the absence of any yet officially adopted it would appear reasonable to adhere to a latin terminology as conforming with that of the nomenclature for diseases in Form K.

Certain changes in this form of a minor character are under consideration, but the present arrangement will be used for the current year.

THE EARLY DIAGNOSIS OF SYPHILIS AND ITS IMPORTANCE FROM A SERVICE STANDPOINT.

By Passed Asst. Surg. O. J. MINK, U. S. Navy.

In his recent work on naval hygiene, Gatewood has shown that syphilis is one of the most damaging diseases in the naval service. It would not, therefore, be out of place to inquire more fully into the extent of this damage, the causes of so great a damage rate, and how it may be decreased.

If we follow the method adopted by that author and transfer all the sick days due to syphilis to one day in the year we find that during the years 1895 to 1905 an average force of 34,295 men have been incapacitated for one day each year. In other words, the average navy has been entirely out of commission for about one and one-half

Methods of diagnosis which would permit a larger per cent of the cases of syphilis to be recognized from the primary sore would eliminate the expectant period of "no treatment," which averages about ten days. It would be only reasonable to infer that the average duration of each case could thus be shortened from seventy-four days to sixty-four days. This would yearly return 4,640 men to duty for one day or keep a battle ship in commission five days and avoid the unproductive expenditure of about \$5,000.

An earlier diagnosis may be considered obtainable by one of two methods: First, the recognition of a characteristic primary sore; second, the recognition of the specific organism by stains or the dark-ground illuminator. In connection with the first method let us consider the chart, which shows the percentage of cases of syphilis diagnosed as syphilis *primativa*. It is apparent that as the knowledge of chancroid as a nonsyphilitic lesion increased medical officers became more and more unwilling to make the diagnosis of primary syphilis. Thus in 1903 only one case in ten was diagnosed from the primary lesion. Shortly after this came the discovery of the specific organism by Schaudinn. However, the rise in the curve is so premature and disappears so completely that we are led to conclude that the results from staining methods represent a combination of overenthusiasm and confusion of harmless spirochætes with the *treponema pallidum*. To those who have compared the results obtained with the dark-ground illuminator its superiority as an accurate instrument of diagnosis over the staining methods must be at once evident. If this instrument continues its present satisfactory work its expense can not be used as a counter argument since one in a fleet is sufficient. Moreover, the reduction of the average duration of treatment one day would save enough money to equip each vessel in the Atlantic, Pacific, and Asiatic fleets.

A FEW TIMELY COMMENTS ON CLOTHING.

By Medical Inspector H. G. BEYER, U. S. Navy.

How great the *apparent* disagreement is between the theory and the practice with regard to clothing; that is, between what clothing should be worn, under a given, definite set of climatic conditions and what clothing, actually, is worn, is, perhaps, nowhere better shown than it is in the answers to the collective inquiry, started last year by the Journal of Tropical Medicine and Hygiene, entitled "Clothing in the Tropics." It should, however, be stated right at the beginning that this disagreement is merely apparent and not real, and that the fault must be looked for in the lack of human knowledge on the subject. The whole subject of the hygiene of clothing is but another

of the many departments of hygiene that has been somewhat neglected and temporarily sidetracked, as it were, having had to make way for the much more fascinating departments of bacteriology and animal parasitology and the more engaging branches devoted to the study of the interesting and promising problems of infection and immunity, and to which at present most of the best talent in medicine are giving their time and devoting their energies.

But the mere observation of the fact that in some of the tropical countries the kind of clothing usually adopted by the people is not exactly in accordance with the dictates of scientific investigations does not necessarily mean, without further considerable qualification, that "science is wrong and practice is right." For, even admitting the great value of the example and of the experience on the part of the natives of a place, it would still remain to be shown that the particular experience and practice referred to had actually demonstrated the fitness of things and thus solved the problem, so that there was nothing further left to do in the matter but to follow the customs established by experience.

Is this really the case? Are the results attained by such experience in all respects so satisfactory and convincing that a blind following of the examples set by the inhabitants of certain tropical countries in the matter of the clothing they wear is all that is necessary to shield and protect us from all the detrimental influences of a climate, or is there still a wide range left unexplored for improvement and study, likely to show the absolute agreement between correct science and a proper application of its principles? Is the European really following the dictates of science when he surrounds his body with three or more layers of clothing, more or less impermeable to air and moisture, as he does at evening functions, even in a hot and moist climate? Is the native really comfortable and sufficiently well protected in his cotton garments against the winds and the rain prevailing during the different seasons or even during the several hours of a single day and night of a tropical climate, or are there not other than scientific questions that must be held responsible for the untoward consequences that are the result?

As is well known, the most important rôle played by clothing in the life of man is to be found in its heat-regulating function. In the case of a temperate or cold climate it is to prevent an abnormal loss of heat from the body and thus to limit the amount of fuel needed in a given time, and this form of protection afforded by clothing makes acclimatization possible, even in the Arctic Zone. But clothing is also worn by civilized man at times and places where it has not the least influence on chemical heat regulation. The object of clothing, under these circumstances, is to prevent the more direct physical effects of the ever-recurring changes (radiation, winds, rains) of

a tropical climate on the body surface. It is then that the easy permeability in clothing, its abundant and free ventilability becomes of fundamental importance, in that it moderates the injurious effects of these outside influences, on the one hand, and facilitates the superfluous amount of heat being given off from the body surface, on the other.

The practical application of clothing to human conditions and requirements must ever be based (1) on the known properties of the tissues of which clothes are made up, (2) the function which they perform in the heat-regulating mechanism of the organism, and (3) the knowledge of the dominant factors of the climate in which a particular kind of clothing is to be worn.

The factors entering into this composite problem are partly constant, partly variable. The scientific results, obtained from the investigation of its physical and chemical properties, assuming that accurate work was done and correct methods employed, are enduring and unchangeable; the study of the climate of a place must be continued daily, and so far as time is concerned, is practically interminable, the results for both time and place are rarely identical but variable, hence we are forced to resort to the adoption of the system of daily, monthly, and annual means, or means for even longer periods of observation. Climate, then, must be considered a variable factor in our problem.

If, therefore, we had to depend on clothing alone to ward off all the detrimental effects a climate might have on man, even if man himself could be considered an invariable factor in the problem, which he is not, it would become absolutely necessary for us to follow up every change in the weather by a suitable change of clothing, and this, on a little thought, is an impossibility.

Hence, it results that there is left between the means at our command and the conditions to be met by them a wide balance for which no provision can be made by clothing on the one hand and climate on the other. This gap can only be filled up by the normal and quite natural resistance of the human body by a calling into requisition of the various physiological defenses of the organism for the purpose of counteracting the injurious influences of the climate not provided for by clothing. This natural resistance of the human organism has a range, though varying with the individual, with a minimum and maximum limit, but capable of cultivation and development. The wider this range in normal resistance the farther apart the two limiting points, the more complete also the adaptation of the man to live in the climate he happens to be placed in. And, since normal human resistance to climatic changes is largely a matter of physical and chemical heat economy, the object being the maintenance of a normal bodily temperature, one of the first and most important functions of

clothing must ever be not so much to protect us from injurious outside influences as to keep from interfering with the normal function of organismal resistance and its development by a proper amount of exercise of this function.

A cardinal mistake in all considerations of clothing and of the different systems of clothing placed on the market, is, that too much stress has always been laid on the properties of the fundamental fibers and not enough on the manner after which they were worked and woven into fabrics. In all considerations of clothing, therefore, we must sharply differentiate between the properties peculiar to the fundamental fibers and the properties which these have acquired in the processes of being worked into fabrics.

As the *primary* properties of the fibers we have to consider their hygroscopic qualities, their absorptive capacity, their elasticity (wool, silk, cotton, linen), and their heat and water conducting powers.

As *secondary* properties we will have to reckon with the air-containing capacity of the tissues and fabrics, their permeability, their minimal and maximal capacity for water, evaporation, radiation, capillary attraction, pore volume, and compressibility.

Our clothing suffers much from a superfluity, especially in warm weather, and when we add to this thermic superfluity a faulty ventilating capacity, produced by ironing, etc., we increase the evil effects many times. Too many clothes keep the skin in a constantly and unnecessary over-active state, forcing it into making strong efforts at water evaporation. This condition predisposes to catching most of the colds. A constant hothouse temperature is not a normal one for our skins. The heat-regulating mechanism, to remain functional and active, must be called into requisition by changes against which we are powerless to provide by clothing, but it must also have its periods of rest for recuperation. The wider the limits between heat retention and the breaking out of perspiration, the stronger also the heat-regulating mechanism.

The premature effusion of perspiration into our clothes, in the majority of cases, is due to a lack of their ventilating capacities.

Clothing which in spite of its great ventilating capacity retains its thermic properties is preferable to all others.

Finally, it is impossible to conceive of a perfect state of health, without a harmonious muscular development, obtainable only through exercise. The love for exercise is unequal at different ages. A large capacity for exercise is a remnant of youthful energy on the part of cell life. Since it is through clothing that evaporation is regulated, a love of sport must depend, in a great measure, on a rational choice of clothing, and any man whose clothes lead to a premature deposition of moisture will probably, and very naturally, remain an habitual enemy of all forms of exercise.

**THE IMPORTANCE OF ELIMINATING THE COCAINE HABITUÉ FROM THE
PERSONNEL OF THE UNITED STATES NAVY AND MARINE CORPS.**

By Passed Asst. Surg. W. D. Owens, U. S. Navy.

It may be coincidence that during the past year and a half 20 enlisted men addicted to the use of cocaine have come under my observation. Certainly the habit is not uncommon.

In an article upon "Cocaine and its relation to the military surgeon," appearing in the April number of "The Military Surgeon," the writer indicated ulceration of the nasal chamber as a possible aid in detecting suspected cases of cocaine snuffing.

Since this article was written, the successful diagnosis of 10 cases has been rendered possible from this single sign. Six privates of the United States Marine Corps were surveyed for this affection on January 5, 1910, while serving with the United States legation guard, Peking, China. The usual method of administering cocaine or its synthetic substitutes is by way of the nasal fossæ, similarly to the manner of using snuff. The use of the quill by which means the drug is passed well into the nasal cavity is not common, and it is only the more advanced addict who resorts to the hypodermic needle. Application of the drug to the gums has been noted in 2 instances.

In order to apprehend the unfortunate who is addicted to this evil it is necessary that one explore well the nasal fossæ for possible lesions incident to snuffing, and in a limited number of cases to examine the arms and legs for possible marks of the hypodermic needle.

Within the nasal chamber the most frequent site of inflammation is the pituitary membrane over the cartilaginous septum. The mucous membrane becomes macerated and disappears. The papules, originally small, spread. The center becomes gray or opalescent and the edges form a definitely defined irregular margin. The inflammation may spread, and in one of the series the septum was perforated incident to necrosis of the cartilage. As a result of the increased blood pressure and of the corrosive action of cocaine upon the Schneiderian membrane epistaxis is not infrequent. The importance of these signs, when noted, were such that a confession was sought and obtained in every instance.

In 3 of a recent series of 6 cases the habit antedated enlistment. The remainder were beginners, having been influenced to adopt the habit by these prior-to-enlistment men who were well versed in the agreeable sensations experienced. This dangerous tendency of the devotee is of paramount importance, for it clearly indicates the direction in which the evil must be eliminated.

In morphinomania the practice may cover an indefinite period without marked effect upon the nervous system. Men who have re-

ceived the highest honors in their respective professions have been morphine habitués. Rosetti, Coleridge, and De Quincy are examples. Coleridge, awakening from an opium sleep, wrote the beautiful verses of *Kublai Khan*.

With cocaine, however, the results are distinctly disastrous. Within five or six months an addictee may become a mental degenerate, not infrequently developing temporary insanity. Surely one who has an unbalanced mind can not be expected to hold civil employment for any length of time, nor should he be tolerated in a military organization.

It is proposed that medical officers on recruiting duty exercise great care in conducting examinations of the nasal chamber.

Candidates for enlistment and reenlistment presenting suspicious lesions within the nose should be rejected. Medical officers becoming cognizant or suspicious of cocaine habitués should immediately request a medical survey and find the addictee "unfit for service."

It may be of interest that recently in a memorial presented to the throne by one of China's viceroys, the attention of the Government was called to the fact that since laws had been established restricting the sale and use of opium the Chinese in no small numbers were finding consolation in cocaine.

INJURIES FROM FOOTBALL AT THE NAVAL ACADEMY.

By Surg. C. E. RIGGS, U. S. Navy.

The discussions which have taken place recently concerning the modification of the present football rules or even abolition of the game at colleges have led me to examine the medical records of midshipmen whose injuries have been attributed to football. I have endeavored to classify the injuries, to ascertain the loss of time caused by the injuries, and to estimate whether or not the injury is likely to be a cause of future disability.

The medical records here arrange themselves under three heads, viz. (1) those in which the condition of the injured player was sufficiently serious to require transfer to the naval hospital; (2) those whose injuries were less severe and who were transferred to sick quarters in Bancroft Hall; (3) those who were able to continue classroom work but not excused from all drills and formations.

There were eight hospital cases. Three of these were fractures, two synovitis, and three sprains. The fractures were, one of cervical vertebræ in the case of a midshipman whose condition is still considered serious, one of the lower extremity of the right fibula, which has recovered, and one of the right clavicle, with considerable contusion of the shoulder joint. The last case is still in the hospital. In both cases of synovitis the left knee joint was involved.

The sprains were of the left knee, right ankle, and right elbow. The hospital cases caused a total loss of school work of 226 days. Twenty-one players were transferred to sick quarters for treatment, and they presented twenty-seven injuries. Some of these injuries were of minor importance and resulted in the loss of but a few days from school work. The injuries with their number of sick days were classed as two abrasions (6 days), eight contusions (38 days), fourteen sprains (63 days), and four synovitis (28 days), a total of 135 days.

Forty-one midshipmen were excused from drills and formations on account of football injuries, and the total number of days absent from such exercises amounts to 114.

During the football season there were fifty-two players who applied for treatment for injuries received and who were either completely or partially excused from school work. The total number of days in which the player was absent from all school work amounts to 361 days, and the total number of days in which he was excused from part of his work amounts to 114 days.

Shortly before the Christmas holidays the players were each questioned as to whether or not any ill effects of the injury still remained. Twenty-eight replied that they had completely recovered, twenty-four gave answers indicating that recovery was not then complete, such as "nearly well," "still weak," and "hurts when taking exercise."

Injuries of the ankle and knee joints have been slowest to recover, and in such injuries it is frequently difficult to determine whether or not the disability has permanently disappeared.

Cases occasionally present themselves where there has been a recurrence of joint symptoms after a period during which the joint was apparently in normal condition. The symptoms are generally brought back by some unusual exercise.

According to the above the number of injuries of football players at the Naval Academy does not appear large. There are several things which may account for this. In the first place, only such injuries are noted as compelled absence from school work. The year 1909 was an off year in football here, as there was no army and navy game. Naturally, there was not as much football enthusiasm as there would have been if the army game had not been canceled some weeks before the season closed.

Also, there is a careful supervision of the players, and it seems that every reasonable precaution for the purpose of avoiding injuries was taken.

MUSCULAR SPASMS IN MEN EXPOSED TO HIGH TEMPERATURES.

By Asst. Surg. M. E. HIGGINS, U. S. Navy.

Within the past year several articles describing a disorder due to exposure to intense heat have appeared in the Journal of the American Medical Association.

The cases reported usually occurred among men exposed to high temperatures in foundries and rolling mills, and were characterized by tonic muscular spasms, particularly of the flexors, associated with fibrillary twitching of the affected muscles.

The condition is a type of heat exhaustion differing materially from what is usually understood by the term, but very frequently seen among men employed in the firerooms of naval and merchant vessels. While, as one writer observes, the affection has not received much attention in the literature it has been long familiar to naval surgeons and has several times been described.

While on temporary duty on board the U. S. S. *Denver* en route from Dalny to Hongkong, September 12, 1909, the following case came under my notice. It presents several points of interest.

Case.—A water tender, age 38, American. He has worked in fire and engine rooms for the past eighteen years; his health has always been excellent, and he has never been affected by the high temperature; his appearance is that of a man of 50; he has a moderate arterio-sclerosis with thickened radials and high tension pulse, having used alcohol for years and frequently to excess. On the day of his attack the temperature of the fireroom was 130° F.

About 2 p. m. he was brought to the sick bay suffering from severe muscular cramps, involving especially the abdominal muscles and the flexors of the extremities. The cramps were tonic spasms, lasting for several minutes. Any change of position or voluntary movement was sufficient to precipitate a spasm of one or more muscle groups. The pain in the affected muscles was agonizing in character. When first seen the man was sweating profusely, and he continued to sweat for several hours. I have never seen a more violent or prolonged perspiration. The pulse was 130, of high tension; temperature, 98° F.; respiration, 20. The tongue was dry and heavily coated. There were no cerebral symptoms. In six hours the cramps had entirely ceased, and with the exception of a sense of soreness in the affected muscles, which persisted for several days, the patient was comfortable.

No urine was passed until the following morning, when he voided 250 c. c., sp. gr. 1.020, high color. Heller's test gave a thick ring of albumin, and there were many finely granular casts. On the second day there appeared but a trace of albumin and a few casts. Five days later neither casts nor albumin were present, and subsequent examinations have shown the same result.

In the majority of the reported cases albumin and casts have not been noted, free perspiration at the time of the seizure has not been the rule, and the men affected have, in most cases, been performing work involving severe muscular effort.

The predisposing cause of the disorder is unquestionably high temperature, but the determining factor is, I think, always some

individual susceptibility, since there are always many men working under precisely the same conditions who are not affected.

Men working in firerooms perspire excessively, and the enormous loss of fluids is made up by the consumption of large quantities of water. Naturally very little or no urine is excreted under such conditions and practically all the work of elimination is thrown upon the skin. If for any reason the function of the skin is impaired or the gastro-intestinal canal fails to absorb sufficient fluid to maintain a proper balance, there would probably supervene a condition not essentially different from the uræmic state (a toxæmia developing in the course of nephritis or in conditions associated with anuria—Osler). The disorder is clinically one of motor irritation. This irritation may be due to a retention in the body of the excrementitious substances of normal metabolism or to the production of abnormal products, a point, I believe, yet to be determined. Whether the irritation is directly active upon the muscles or upon the motor elements of the cord is also problematical. The agonizing cramps of cholera, due to the great loss of fluids, and the convulsions of nephritis are, in a measure, analogous conditions.

In some instances sweating has been profuse and suddenly ceased. Occasionally the cramps do not develop until the man has left the superheated atmosphere and cooled off. Many men attribute their attacks to standing under blowers while perspiring freely. Cases occur more frequently among crews that have become "soft" and then resumed hard work. Some individuals seem particularly predisposed. The attacks vary greatly in intensity; the cramps may be slight and transitory or quite severe as in the foregoing case.

Treatment.—The indications are to supply fluid, secure elimination, and relieve the pain. Saline solution, either by rectum or under the skin, meets the first two, and a full dose of morphia lessens the pain.

Apomorphine in doses of gr. 1/20 has been strongly recommended by one writer for relaxation. If the patient is not perspiring a hot pack or a hot bath is indicated.

NOTES ON SANITATION AT PORT ROYAL, S. C.

(From the sanitary report of the United States Marine Officers' School and United States Naval Hospital, Port Royal, S. C., 1909.)

By Passed Asst. Surg. R. E. Riggs, U. S. Navy.

From the first of the year until early in February, when the *Prairie* brought down the first considerable body of men, there had been little or no sickness among the few men forming the guard of the station during its period of abandonment. With the coming of the *Prairie*, however, measles, scarlet fever, and pseudo-diphtheria appeared.

The two first-named diseases promptly subsided, following proper sanitary precautions, but not so with the last-named disease, for it appeared and disappeared at longer or shorter intervals until May, when it culminated in a very general outbreak. This encounter of pseudo-diphtheria was unique in so far as my own experience is concerned, and as an epidemic it merits description.

Pseudo-diphtheria.—So numerous were the sick from this disease, and others suffering from a concomitant outbreak of diarrheal troubles, that for a little while the hospital was overcrowded, and men had to be accommodated along the verandas and in tents. Being constantly employed in caring for these sick, and in the investigation of the diseases present, little opportunity was had for recording them beyond the daily report of sick. And so it is that fewer cases appear on the returns for that quarter than actually occurred. No injustice resulted, however, through this unavoidable omission, since all cases lasting for more than one night and day were recorded.

Clinically, all cases of pseudo-diphtheria were exactly alike, and so strongly resembled true diphtheria that it was not possible to differentiate them at first without a microscope. Later the following points of difference were apparent: The course of the disease was brief; the affection was self-limited; antitoxin treatment was not necessary, and no complications or sequelæ were observed.

In taking cultures, Löffler's blood serum and egg white were the media employed. Under the microscope the following points were noted: The organism resembled the Klebs-Löffler bacillus in arrangement, false branching, parallelism, and appeared in schools. It was stouter in proportion to length, stained more deeply and uniformly, and generally lacked the graceful curving and the multipolar staining peculiarity of the true diphtheria bacillus.

It stained by Gram's, with methylene blue, and by Neisser's method, exhibiting bipolar bodies, but not uniformly with Neisser's stain, its attitude in this respect being best described as evasive.

Physiologically, it failed to impair the health of a healthy young white rabbit after the subcutaneous injection of 3 c. c. of the pure culture suspended in water.

Tonsillitis of the types usually encountered was present at the same time, before, and also after the outbreak of pseudo-diphtheria referred to above. All, including the last-named disease, are grouped together and mentioned as benign throat affections in order to bring into prominence the agent which was employed to eradicate the infections—that is, sunlight.

At first an attempt was made to control the spread of these diseases by isolation of the sick, general use of hand atomizers, and the free use of bichloride solution on the floors and furnishings of the barracks. These efforts met with no success, and finally it was decided

that everything movable should be taken out of barracks and exposed to the broiling sun all day long. This was done, whereupon the infections disappeared as if by magic.

Once since the same resort was had to combat an epidemic of sore throat among the student officers, the disease in this case having been imported by one of their number from Sea Girt in June. The result was prompt and lasting.

Surgeon Grove's observations upon this subject, as quoted in the report of the Surgeon-General, 1909, find confirmation in my experiences here.

While I have no doubt that sanatoria generally are acquainted with the "efficacy of sunlight," and doubtless some apply the knowledge in a practical way, it is questionable whether full advantage is taken of this greatest of natural disinfectants. Even the very textbooks on hygiene and sanitation either refer to the matter in a casual way in connection with "airing bedding," or ignore the subject altogether.

Enteric diseases.—Beginning in May diarrhea and dysentery appeared, particularly the former. The dysentery cases were much less numerous than the diarrheal, but began as such, and both were probably due to a common cause. The dysentery alone was investigated microscopically, however, and some few cases revealed amœbæ. In these the amœboid movement was detected, and they contained red blood cells. As against the view of amœbic origin, it is submitted that the majority of the cases were of short duration, of infrequent recurrence, and were amenable to treatment. On the other hand, I know that dysentery has been common in this State for years, and hardly any neighborhood is without some particular case of long duration and more or less severity. It may therefore be and likely is true that amœbic dysentery has prevailed hereabouts for generations, and has gradually lessened in virulence. Analogously this may be mentioned as true of malarial fevers and smallpox.

It was found that much of the intestinal disorder among our people was caused by the ingestion of the soft drinks put up by a bottling concern in Beaufort. Chemical analysis showed adulteration, and investigation revealed the fact that the water used was not sterilized and bottles were unclean. Enlisting the cooperation of the health authorities, these concerns were induced to clean house and to install modern machinery. A lecture was delivered, by invitation, at a mass meeting of citizens touching sanitary matters, and it is believed that the interest enlisted will go far toward safe-guarding the public health of neighboring communities, and so insure good-health conditions at this station.

A new operating room has been constructed as an annex to the room formerly used for this purpose, the latter being utilized as a

sterilizing room. Although planned by the hospital stewards and built entirely by convalescent patients, I believe that this operating room is not only sufficient for all our needs but will compare favorably with operating spaces of more pretentious institutions. Sterile work is provided for and aseptic results invariably attained.

REPORTS ON VENEREAL PROPHYLAXIS.

U. S. S. Tacoma, July 30, 1909: After a conference with the commanding officer, April 1, 1909, at Porto Cortez, Honduras, the following plan was worked out, viz, that I conduct a campaign of education, combined with prophylactic treatment, which latter was not to be compulsory, but to see what reliance on the common sense and judgment of the crew would do. On the day after receiving the above I began taking fifteen men daily and giving them a talk on the prevention of venereal disease, lasting from sixty to ninety minutes. I continued this daily until the entire ship's company had been gone over, and not a single man had missed them.

SYNOPSIS OF TALKS.

Venereal diseases; what they are and how contracted.

Gonorrhea, its pathology, symptoms, sequelæ, amenability to treatment, complications; its dangers to the patient, community; its marital dangers and possible effect on the offspring. The financial losses due to gonorrhea.

Chancroid: Etiology, symptoms, pathology, complications, loss of time and money incident thereto, also its dangers to the community.

Syphilis: What it is; its symptoms, pathology, complications, effects on patient, childbirth, on the community. Early and late lesions, its curability.

The lesser venereal conditions, balanitis, herpes, etc.

All of the above was put in very clear language, the men appeared to be attentive, and all intimated that they understood it.

After I was fairly sure that they understood what these diseases were, and their danger, I proceeded to the subject of prophylaxis, somewhat as follows:

First. Men were cautioned when they went ashore that if they wanted sexual intercourse it should be taken first, and the rum later, as I tried to impress them with the fact that a man who has taken liquor is more susceptible than one who has not, in that he is less careful than he would be if he had not taken any.

Second. Try to select as clean conditions as possible, or at least such as would supply them with water, and if they could not get water, leave the place and go elsewhere.

Third. After sexual intercourse, to wash first thoroughly in plain soap and warm water, as much venereal disease can be prevented by simple methods of cleanliness alone. Having done this, dissolve one tablet of bichloride of mercury in a pint of warm water and soak the penis several minutes, washing well down behind the corona of glans penis, the tablets referred to being given to liberty men on application to the sick bay.

Upon returning to the ship the men who had exposed themselves were to report to the hospital corps man on watch, who would give them the treatment prescribed in the bureau's letter, namely, the irrigation, followed by injection of 2 per cent protargol, to be held five minutes. The inunction of 33 $\frac{1}{3}$ per cent calomel ointment was then to be used as directed.

In the hope that a number would take advantage of this method, I told the classes that I did not wish men to report to me when they came back, but simply to the man on watch, as I did not want to know who they were, and would make no attempt to find out, excepting, of course, a man who was suspected of having disease.

In other words, everything possible was done to insure a successful campaign if cooperation of the men could be secured. Shortly after receiving the departmental orders relating to venereal prophylaxis this ship was ordered to New York, and the last talk was given on our way into New York Harbor, so that the thing must have been fresh in the minds of all. The ship arrived in New York April 20, 1909, and that night 109 men out of about 260 then on board were given liberty, and out of that party one man reported for his prophylaxis. On the second night 11 men had liberty, and two men reported for the treatment. On the third day one man reported, and after that none appeared from the parties.

During our stay in New York five cases of venereal disease—three of gonorrhea and two of chancroid—appeared for treatment, and on leaving New York two cases only were under treatment. I then requested of the commanding officer permission to examine the crew, which was granted. On the completion of this examination, which included every man aboard, 28 cases of venereal disease had been found.

From the above report it is only too evident that my campaign, though carefully worked out, was a total failure, which has made me realize strongly that education is a good thing if aided by force, and without it we are powerless, and until compulsory measures are taken, covered by regulations, our talking and treatment will avail us nothing.

Now the question of the efficacy of this treatment naturally comes up. Is it really of value? That it is of the utmost value I am absolutely certain, as I have had some most convincing demonstrations,

particularly regarding gonorrhea, and I know of instances which can not be questioned.

This being known, I am sure we will be successful if we can obtain regulations covering this subject, but I am only too well aware of the opposition this course would bring from certain organizations in civil life.

During the present quarter to date there have been thirty-five patients admitted to the journal, and of these twenty are venereals. At present there are six men on the sick list, three being venereals. There are twenty-six men on the sanitary quarantine list with venereal disease.

U. S. S. Tacoma, December 5, 1909.—My first report was submitted to the bureau on July 30, 1909, and as the results under the two methods differ so greatly I think the comparison will be of no little interest.

After my first experience, realizing that I had wasted time and energy on the so-called educational method, I decided to try other tactics. We have examined the regulations for assistance in this respect, and find that the question of obedience to orders will cover the ground if the order can be obtained.

Shortly after a conference the commanding officer called the crew to quarters and reminded them that they had all been thoroughly instructed in venereal prophylaxis, and were thus given the opportunity to take advantage of it. It had now become evident that the members of the crew did not seem to care if they contracted disease or not, but the time had arrived when it became a necessity to make these measures compulsory in order to maintain the military efficiency of the ship.

The crew were informed that if they did not carry out the measures advocated by the medical officer they would be severely punished. This talk was just the very thing that was required. It was not so stated by the commanding officer, but the report soon became prevalent that anyone not reporting for prophylaxis after exposure would be court-martialed. The effect of this was magical, and I am sure that with the exception of a few worthless characters, who developed venereal disease, every man exposed has appeared for the treatment.

Shortly after the talk given by the commanding officer I received 300 copies of a most instructive little pamphlet published by the American Medical Association, entitled, "The Boys' Venereal Peril." There were not enough copies of this little book to go around, and requests were made for extra copies. In addition to the above, the subject has been constantly kept before their minds by talks on the various related topics, such as "Charlatans and their methods," etc.

The following direct orders were given to the crew:

(1) Liberty will be given daily from 1 to 5.30 p. m., on Sundays from 9.30 a. m. to 5.30 p. m. Chief petty officers have liberty until 10 p. m.. This applies to Central American towns.

(2) All men who have been exposed to venereal disease will report at the sick bay and be given prophylactic treatment.

(3) Those men who have not reported and then develop venereal disease will be punished for disobedience of orders.

(4) A member of the hospital corps will be on duty for supervision of the treatments from 4 until 10.30 p. m., and from 7 to 9 a. m.

Methods.—It was recommended to the men to use tablets of bichloride of mercury ashore directly after intercourse, and I have learned that a number of them did so.

IN THE SICK BAY.

(1) Thorough cleansing in hot soap and water after urination.

(2) Washing external genitals with a 1 to 1,000 bichloride of mercury solution. (Despite the experiences of others, I have never seen this strength produce irritation.)

(3) An injection of 2 per cent protargol is given, about 5 c. c. being used. It was found in the use of this injection that the great difficulty was in getting the men to hold it five minutes, that apparently being too much trouble. In order to overcome this and have some of the solution retained, even if held for one minute only, I decided to add 20 per cent glycerin to this solution. This did not prove to be an extra irritant, and made the substance adhere, even when held for a few minutes only. I later found 15 per cent glycerin to be sufficient. The injection in all these cases was supposed to be held for five minutes.

(4) Following the injection the Metchnikoff's calomel ointment was used. When first starting our crusade the above ointment was made up with equal parts of benzoinated lard and vaseline as a base, but experience demonstrated that equal parts of lanolin and vaseline were more tenacious, and had greater penetrating powers, so that at present this latter combination is used.

After penis is thoroughly dried, this ointment is spread over the entire penis, from external meatus to root at symphysis pubis. It is then thoroughly rubbed in and left on for two hours. A number of men have left this on all night with no evil effects.

The ports visited during the use of these methods are all notorious for their venereal disease, so that when one visits the hospitals they are found to be overcrowded with venereal conditions, aside from the many untreated and neglected cases that run at large.

The points visited by the ship during this period were Bluefields, Little and Great Corn Island, Port Limon, Bocas del Toro, Panama, and Colon. This report covers a period of five months.

In examining this report and the results at end, one will be struck at once by the latter, which, I think, are truly remarkable. In addition, one can not help noting the large number of exposures. As to whether this has been fostered by the use of a reliable preventive I do not know, but that is another question.

I think that anyone who has visited these countries of Central and South America will realize that this is more than a coincidence.

Some will perhaps say there must have been some who did not take treatment; if so, did they develop venereal disease? Yes; and my records show the following: During our first visit to Port Limon one case of gonorrhea appeared in a man who had not taken the treatment. In Colon a case of chancroid and one of gonorrhea developed in this manner. The records also show two chronic gonorrheas which have had several relapses. Three cases of gonorrhea were received from the U. S. S. *Newark*, admitted for record, and at once returned.

The greatest surprise to me in reviewing the exposures is the prevention of chancroid, this organism as a rule being so very virulent. I had expected good results in the prevention of gonorrhea, but not so much so in that of chancroid. Chancroid is very prevalent in Colon, so that I know our methods must have prevented it.

Results of present method.—In the time covered by this report there were over 3,000 liberties and 756 men, exposed to venereal disease, took prophylaxis and did not develop venereal disease.—

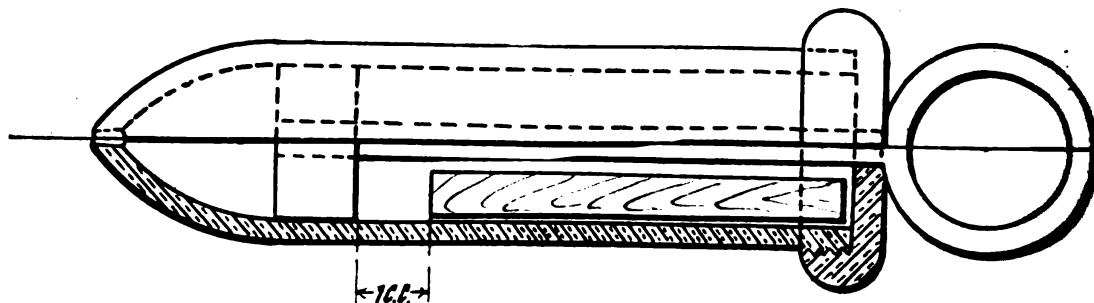
PASSED ASST. SURG. W. S. PUGH, JR.

U. S. S. Tennessee.—In May, 1909, was begun the prophylactic treatment of venereal diseases. Educational talks were given by the medical officers, but actual taking of the prophylaxis by men exposed was left to their volition; the results were disappointing. From the installation of the method up to September 10, 14 men applied for treatment. During the same period 41 cases of venereal infection were admitted to sick list. The method was a failure. On August 20, taking advantage of our expected departure from home ports, the medical officer recommended a change in the application of the scheme. These recommendations were essentially the same as had been provided on certain other vessels in the service, consisting of compulsory reporting at sick bay on return from liberty, a copy of the liberty list being furnished for the use of the medical department. The men were to report to the members of the hospital corps and not to the medical officer.

Method.—A carbon copy of the liberty list is furnished the medical department, and when the men return they check off at sick bay, stating whether or not they have been exposed to infection. This data is entered against their name by hospital corps men on duty, and if exposure is admitted the man is given the treatment outlined by bureau circular.

For this purpose, while the ship is in port the port side of sick bay is curtailed off, the arrangement of the doorways being convenient for this purpose. Several "stands" of treatment are available for use, each "stand" consisting of a wooden base into which are set two 100 c. c. preserve jars and one 1-ounce ointment pot. The ointment pot contains 30 per cent calomel ointment. One jar contains about 50 c. c. of a freshly made 3 per cent protargol solution for injection. This small quantity requires frequent renewal, thereby

insuring a freshly made solution. In the second jar is a 1:5,000 solution of mercuric chloride in which two penis syringes are kept immersed. Each syringe (see Fig. 1) has previously been prepared by having a small wooden stick or section of glass rod inserted between piston head and cylinder top, of sufficient length to permit 1 c. c. of fluid to be drawn into the syringe. This modified syringe (see figure) is cleanly and insures an accurate amount of fluid for injection without waste.



By the use of this simple apparatus, basins of mercuric chloride 1:1,000 for penis wash and buckets for waste, a minimum of time is expended for each treatment given, which is a factor for consideration on ships with a complement of 900 to 1,000.

Since the installation of our new method the following three ports have been visited:

Ports visited.	Total number of liberties.	Admitted exposures.	Cases of—		
			Gonorrhoea.	Syphilis.	Chancreoid.
Honolulu, September 10 to October 5.....	1,908	207	9	1	3
Manila, October 30 to December 10.....	1,686	342	3	(a)	3
Shanghai, December 14 to December 30..	1,293	525	3	(b)	2

^a Time insufficient.

^b Elapsed time insufficient to fully determine.

As yet, sufficient time has not elapsed to determine the actual benefits to be derived from the new method of applying the prophylaxis.—PASSED ASST. SURG. W. A. ANGWIN.

U. S. S. Dolphin, 1910: The means of conducting venereal prophylaxis in the naval service have been the subject of a number of very interesting papers during the past year or so, but most, if not all, authors seem to believe that a rigid restricted list is necessary *per se* to obtain the desired end.

While such rigid measures effectually carried out may hasten results, are not some of the objections offered to the use of the restricted list well worth consideration? All medical officers appreciate the fact that the old-time restricted list obtained its names solely from those men who were so badly infected as to be physically unable to perform their routine duties, or had no money to buy one of the many nostrums offered them on shore. The use of such a restricted

list undoubtedly does to some extent at least protect (?) prostitutes on shore from infection by men of the navy, and in this roundabout way may protect shipmates from a like infection. But unless the restriction is thorough (first general examination of crew and then regular examination of men going and returning from liberty, with proper entering, indexing, and cataloguing of every man of the crew), but few medical officers will even infer that much good is thereby accomplished and most will agree that the final result of such a list is the restriction of a very small per cent of those infected. These objections may be overcome when the commanding officer approves of a complete and constant examination as outlined above, but a man's inherent self-respect is undoubtedly weakened by compulsory examination for venereal disease before each and every liberty. The very prominence given to the subject at liberty times overcomes by suggestion most if not all of the good obtained by the required instruction of the crew relative to abstinence. In view of these objections the plan of constant and systematic instruction of the crew in the vital principles of venereal diseases was adopted on this vessel prior to July, 1909, especial stress being laid on the fact that these diseases are preventable.

The personnel of a recently commissioned ship appreciates that some months' hard work is necessary before the ship is up to the mark in either general or special drill work. If the same appreciation is extended toward the physical condition of the crew as a community, it seems possible to bring about the same general excellence within the same time. Personal instruction and appeal to the petty officers individually and as a body will almost surely reach all members of the crew in a comparatively short time. Once the majority of a crew appreciates the ease with which its members may avoid venereal troubles and the real seriousness of such untreated troubles in shipmates, they themselves are quick to send all who try to conceal such diseases to the sick bay.

The ideal condition is reached when the men so understand the dangers of venereal diseases that they voluntarily ask for preventive treatment, and the small percentage that do not of their own free will are forced to do so by their shipmates. Once this is established the rest comes easily, provided the preventive treatment is readily obtained and "does not hurt." But a few moments is required of each exposed man to wash thoroughly with a 1 to 1,000 bichloride solution, use a 20 per cent argyrol injection for four minutes, and anoint the parts thoroughly with a 30 per cent calomel ointment.

As the great majority of all liberty men return to the ship within twelve to twenty-four hours, this prophylactic treatment is effective in practically all cases. To maintain this condition all concealment or attempted concealment of any venereal disease should be promptly

reported with view to severe punishment. On board this vessel three such cases have been encountered since July 1, 1909.

Argyrol is suggested as being superior to other prophylactic injections in that it is absolutely nonirritating in very strong solutions.

The results obtained on this vessel by instruction as outlined from July 1, 1909, to March 1, 1910, are as follows:

Number of liberties, 18,860; total number of men infected with venereal diseases, 21.

These infections were as follows: Sixteen men with gonorrhea alone; one man with gonorrhea and chancroid; one man with gonorrhea and syphilis; three men with syphilis.

None of these cases used prophylactic treatment.—PASSED ASST. SURG. N. T. M'LEAN.

U. S. S. Connecticut, 1909: Prophylaxis against venereal diseases has been in force during the last quarter of the year. The manner of using this valuable asset is the prime question. It hardly seems necessary, and indeed appears undesirable, that every person who has exposed himself should be required to notify the medical officer, that he may receive treatment. It is believed that thorough education of the crew as to its value and then accommodations for its application would be the main factors in eradicating or markedly lessening the number contracting these diseases. During the third quarter the entire crew was instructed and an attempt made to bring the subject forcibly before them as to the harm done them in contracting such diseases, and secondly the probability of being noninfected if the prophylactic treatment was thoroughly carried out within certain time limits. Shelves were installed in the petty officers', seamen's, firemen's, and servants' wash rooms, and thereupon were placed basins, jars containing syringes in antiseptic solution, wide-mouth bottles with protargol solution and boxes of calomel ointment, so that the treatment could be applied by themselves at any time they returned on board and numbers could have treatment at the same time. When in port the above remedies were always at the crew's disposition, being stowed away at sea. That numbers voluntarily used the applications could be demonstrated by the quantities of the material required. During the three months one box of ointment, four bottles of solution, and fifteen syringes were unlawfully appropriated, probably taken ashore for use. One weak factor early manifested itself—it is common practice for members of the crew to have a longer leave than twenty-four hours and then again many go on from five days' to two weeks' leave, in which cases the treatment fails to be available. It would appear to be a most valuable desideratum that the men be allowed to take with them, before going on leave, a packet containing the prophylactic treatment, for the cost of these outfits

would amount to a few thousand dollars yearly for the entire navy and this amount would be much less than is now required in dressings, medicines, and hospital care for those contracting such diseases without considering the time lost from their military duties, invaliding from the service, with the lasting harm to themselves, their progeny, and society. No remedy is at present known for those who overstay their leave from debauch, for such would not be capable of appreciating or applying remedies when in such condition, and it is among this class and those above spoken of as legitimately absent over the time limit of prophylaxis that the failures of the system have occurred.

It is considered that the following statistics are almost accurate for the venereal diseases during the year, since, in drafts of men transferred to other stations, frequent examination of various members of the crew have failed to elicit any venereal cases of which we were not cognizant:

For the year :	Cases.
Adenitis inguinalis	19
Chancroid	68
Epididymitis	18
Gonorrhea	121
Ophthalmia gonorrhoea	3
Orchitis	5
Prostatitis	2
Syphilis consecutiva	32
Syphilis primitiva	2

The above totals 270, or one for every three and one-third members of the crew.

During the year it averages 35 men under treatment for syphilis, requiring at least three years' continuous medication.

The second and fourth quarters are almost identical as to conditions of shore going, the vessel during both periods being almost continuously in New York.

Second quarter :	Cases.
Adenitis inguinalis	3
Chancroid	14
Epididymitis	5
Gonorrhea	39
Ophthalmia gonorrhoea	2
Orchitis	2
Syphilis consecutiva	10
Fourth quarter, after crew was instructed in prophylaxis :	
Adenitis inguinalis	1
Chancroid	8
Epididymitis	2
Gonorrhea	36
Ophthalmia gonorrhoea	1
Orchitis	2
Syphilis consecutiva	2

The above shows a difference of 23 cases in favor of prophylatic period. Again, not one of the above cases was contracted by anyone who used the remedy within fifteen hours after exposure. Of the above number 8 returned in time and could have used it; 44 remained absent from the ship too long a period to apply. During the coming year it is hoped opportunity will be available for continual instruction of the crew on this subject, and again that the Department will sanction a packet containing the treatment to be freely taken ashore by the men.—MEDICAL INSPECTOR J. M. EDGAR.

U. S. S. New York, 1909: A system of venereal prophylaxis was established as soon as possible after commissioning. By authority of the commanding officer, who has invariably facilitated the work of the medical department in every possible way, the crew's lavatory on the starboard side of the gun deck was reserved for two hours on each morning after liberty had been granted for use of the men taking the preventative. Two hospital corps men were in attendance with antiseptic solutions for cleaning the genitals, and solutions of silver nitrate, or protargol and calomel ointment. The commanding officer still further advanced our efforts in this direction by authorizing the announcement that men taking preventive treatment would not be restricted to the ship in case of the preventative failing to avert disease. In spite of this liberality it has been disappointing to note the comparatively small number of men employing prophylaxis. It is not entirely due to apathy or laziness. To a large extent the neglect is through ignorance, and instruction by medical officers to the crew should be repeated and systematic. Still more important is the fact that most of our men to-day are of such a class and type as to resent the unavoidable publicity attached to the whole business as now conducted. I have always found officers eager to profit by the "preventive treatment," and invariably rewarded for their trouble by freedom from disease afterwards. They take the treatment in the privacy of their rooms. Were they under the necessity of using the prophylatic treatment in the wardroom water-closet it would be very different.

There is a growing appreciation on the part of officers and men of the value of venereal prophylaxis. Results justify this. It is to be hoped therefore that in time, with persistent reiteration on the subject, permanent and systematic provision will be made for effectively carrying it out, and for that a special place must be provided. The sick-bay bathroom is too small, and for many other reasons, unsuitable. The men's head is too public and too crowded in the morning hours (during which alone the preventative can be employed) for any large number of men seeking late "evening" or all-night liberty. Furthermore the treatment must be supervised by at least two hospital corps men. A water-closet is scarcely the place for venereal

prophylaxis as it should be conducted. Thoroughness is essential to success. Unless the men are convinced that the preventive treatment really prevents they can scarcely be expected to bother with it.

All that is required is a place easy of access, not too public, and sufficiently roomy to accommodate 10 per cent of the average liberty party at a time, furnished with a porcelain-lined trough (noncorrodable) with a shelf above where syringes and solutions may be placed. There should be separate entrance and exit to prevent crowding and confusion. A hospital apprentice, first class, at the entrance door satisfies himself that the applicant is not already suffering from gonorrhea and gives him necessary directions. At the exit a hospital apprentice takes down for future reference and statistics the names of men using preventive treatment as they file out. Running water with faucets at convenient distances to the number of six, eight, or ten, according to size of the ship and her complement, should be placed so that the applicant may cleanse the parts thoroughly with soap under a stream of water before using the medicinal agents furnished.

My experience has convinced me that a 1 to 5,000 silver nitrate solution is equal or superior to any silver preparation if retained for ten minutes, and it has the advantage of being cheap and less irritating than protargol. Owing to the need of more time and patience in the use of the calomel ointment, I consider it less reliable as a preventative than the measures employed against gonorrhea. SURG. J. S. TAYLOR.

U. S. S. West Virginia: During the year the prophylaxis of venereal disease has attracted a good deal of attention and time. The number of venereal cases was 149 and the number of sick days attributed to it was 589. For the last three-quarters of the year the prophylaxis has been pursued in accordance with the methods suggested by the department. Every opportunity was seized upon to diffuse information among the crew on the subject by lectures, private conversation, and otherwise, to overcome the common belief that sexual continence is incompatible with health and also to impress the men with the importance of prophylaxis whenever exposure has occurred. Two compartments of the ship's shower baths have been equipped and reserved exclusively for such treatment.

The results from these methods in the second and third quarters were obtained without coercion; dependence was placed upon the popularity that might be aroused by lectures, private conversation, etc., which were given before each liberty party went on shore. In the fourth quarter, however, the policy of coercion was adopted.

The comparison of the first quarter, without prophylaxis, with that of the second and third quarters, during which preventive treatment was afforded without coercion, and with that of the fourth

quarter, i e., prophylaxis with coercion, may be of interest. In the first quarter 30, in the second and third quarter 23 and 41, respectively, and in the fourth quarter 13 venereal cases came under observation. The comparative increase of venereal cases in the third quarter is attributed to the greater number of men exposing themselves to infection, as liberty was freely given at the navy-yard where this vessel spent most of the time during the quarter.

In the second and third quarters 33 per cent of the venereal patients stated that they had used the prophylaxis. To increase the use of preventive treatment for the fourth quarter every man, on returning from liberty, was directed to report to the sick bay, whether or not he had consorted with a prostitute. If he had exposed himself he was immediately given the prophylaxis under the direct supervision of a hospital apprentice. For the fourth quarter 1,178 men or 33.8 per cent of the liberty party admitted exposure to infection and were given the preventative. Only five cases of the admitted exposures failed to respond to the prophylaxis in venereal diseases. The remaining eight of the total infected cases denied exposure and consequently did not take the prophylactic treatment.

The virulence of the infection at the different ports visited has been a factor, which can not be taken into account because the ship did not stay long enough in any one place to make the necessary observation.

Though these data are too small upon which to base any definite conclusions, it seems from the above statistics that venereal prophylaxis gives the best results when coercion is employed.—PASSED ASST. SURG. F. G. ABEKEN.

ARE DEAD TYPHOID CULTURES OF VALUE FOR USE ON BOARD SHIP IN WIDAL'S REACTION?

By Surg. C. S. BUTLER, U. S. Navy.

This question is naturally one of great value to the naval medical officer. From an experience of several years with dead typhoid cultures I am inclined to the belief that this question must be answered in the negative. By none of the methods of preparation which we have used at the Naval Medical School have we obtained a dead culture which was satisfactory from the standpoint of sensitiveness, and if fairly sensitive in the beginning it is not usual for this sensitiveness to be retained for any length of time.

To the naval as to the lay physician it is a great gain to say definitely at an early date in a suspicious fever, "this is or is not typhoid." Judged by this standard, the dead typhoid culture is useless, as I believe it is the exception that it answers the question at a date earlier than that on which the clinical symptoms would give

the diagnosis. We know that it is unusual for agglutinins to appear in amounts potent for even the live sensitive organism before the tenth day. Naturally, it takes a longer time for the larger quantity necessary to agglutinate dead cultures to make its appearance in the blood. This would to my mind not be earlier than the fifteenth day. If, even at the high tide of the agglutinating capacity of the patient's serum, there was a definite unmistakable clumping of dead cultures, these cultures would still have their place, but there is not. The agglutination is not the frank "come together and quit" of the live organism, but an indeterminate sort of grouping, which leaves the observer wondering whether he had not better toss a coin for the diagnosis. It is thus for the laboratory man and how much more confusing is it for the man whose judgment of a Widal may not be any too keen at best. The simple procedure of taking 5 c. c. of blood aseptically and placing it in an excess of bouillon and incubating over night in a moderately warm place, gives us results which, while not ideal from the determinative standpoint, are far and away more trustworthy and give us an earlier and more decisive opinion than can be possibly obtained from the dead-culture Widal. The finding of a bacillus in a hanging drop made from such a bouillon blood culture after incubation at from 30° to 37° C. for twenty-four hours is nearly conclusive. This bacillus need not necessarily be very motile as in this primary culture *B. typhosus* shows no motility, or perhaps only a few elements in the hanging drop may show slight motility. Now, if some of this primary culture (2 loopfuls) be transferred to the sterile bouillon in a test tube and incubated for twenty-four hours longer, the organism is obtained in pure culture and can be tried against the patient's serum. If in this second culture, an organism is gotten which is motile and morphologically correct, the patient had better be transferred to a hospital. Of course, it is necessary that the technique be perfect and the bouillon sterile. The bouillon can be made in the galley or by the hospital apprentice. Its reaction, when made from Liebig's extract (using 3 grams per 1,000 c. c. of water) need not be arranged, as it is always around +1.5, which is favorable for *B. typhosus*. The above technique requires only sterile bouillon (which can be preserved in sealed bottles indefinitely or made for the occasion) and the usual surgical care in taking the 5 c. c. of blood and getting it quickly into 100 c. c. of bouillon. The method depends for its exactness upon the getting of a motile quickly growing bacillus from the blood. This does not occur commonly except in typhoid and allied septicemias. If in addition this bacillus agglutinates with the patient's serum, while this neither identifies the organism nor the disease it indicates that the organism is not a contamination and that it stands in etiological relation to the condition.

It would not be difficult to keep in sterile-sealed bottles on every ship, or at any rate on the hospital ship, a small quantity of ox-bile. Ten c. c. of this poured with aseptic precautions into a sterile test tube would take the place of the primary culture mentioned above, and it would have the advantage of preventing any tendency to clotting of the blood. In other words, it would enable us to carry out Conrad's blood culture technique on board ship. On account of storage and evaporation it would be an advantage to keep this in a single sealed container. Ten or 15 c. c. of this will prevent clotting of 5 c. c. of blood, and as it restrains growth of other bacteria and favors *B. typhosus*, the finding of a bacillus in this medium in an 18 to 24 hour culture is better presumptive evidence of typhoid than in case of the bouillon culture. From the examination of this primary bile culture to ascertain the presence of a bacillus and the subsequent plating out and verifying results by specific measures in quite a large number of cases, I am convinced that the finding of a motile bacillus in this primary culture, made as above indicated, gives a far more dependable answer than can be obtained by a dead culture Widal at any time during the course of typhoid fever. The answer can be made absolute by transferring a loop (6 mm. across) of this primary culture to each of two bouillon tubes incubating for eighteen hours at room temperature and then transferring to one of these the same sized loop of P. D. & Co. typhoid immune serum. In a short time the macroscopic finding is evident and the result controlled. But what I wish to stress is that the mere presence or absence of an unidentified bacillus in the primary culture during the first two weeks of a suspicious fever gives a more dependable answer than is ever given by dead typhoid cultures applied in Widal's test.

PROGRESS IN MEDICAL SCIENCES.

LABORATORY.

Passed Asst. Surg. O. J. MINK and Asst. Surg. E. W. BROWN, U. S. Navy.

THE NOGUCHI TEST FOR SYPHILIS.

Of the many modifications of Wassermann's reaction, the method worked out by Noguchi seems to have everything in its favor from the standpoint of the naval medical officer. It is the simplest of all the tests so far proposed. It is the most wieldy of all, as the antigen and amboceptor can be kept on hand in filter papers, and the red blood cells are those of human beings. The antigen does not have to be that from syphilitic liver, which is almost impossible to get, but may be extracted from normal guinea pig's liver and kept in impregnated filter paper. The method is exact and scientifically planned and gives results comparable, to say the least, to any of the more unwieldy methods. From the very nature of the principles involved none of these tests can be called simple. To start from the ground and acquire the materials for Noguchi's test is, of course, a thing possible only in a well-equipped laboratory; but the fact that these materials once gotten can be kept on hand or mailed to any quarter is the merit of the test. In one particular (that of complement) the test is on the same basis as others of this class. The complement should be fresh guinea pigs' complement as it has been found less reliable (on account of its keeping qualities) to use complement taken up in filter paper. Noguchi recommends the use of fresh complement whenever practicable. It may not be out of place to outline the test; but for the complete description, the article of Noguchi in the *Journal of Experimental Medicine* for January, 1909, and his recently published book on the test should be consulted.

(1) Complement. The fresh serum of a guinea pig mixed with normal (0.9 per cent) salt solution in the proportion of 2 to 3. Of this mixture 0.1 c.c. (2 units) is the usual quantity.

(2) Amboceptor. The amboceptor is antihuman and obtained by inoculating human red blood cells into rabbits. Three or four inoculations of increasing amounts at intervals of a week will usually produce the desired titre of serum. This should be tested before the

animal is bled. The separated serum is taken up in the filter paper strips of convenient length and breadth, and the exact length of this paper necessary to hæmolyse completely the required dose of red blood cells used in the test is determined by titration. Twice this amount is the length of paper to use in the test.

(3) Blood corpuscles. One drop of human blood to 4 c. c. of normal salt solution constitutes the r. b. c. emulsion. It is better to wash the corpuscles, but this is not absolutely necessary.

(4) Antigen.

Extract a mashed paste of liver, heart, or kidney of man, ox, guinea pig, rabbit, or dog with ten parts of absolute alcohol at 37° C. for several days. Filter through paper and collect the filtrate. This is brought to dryness by evaporation, the residue is taken up with a small quantity of ether and 5 volumes of acetone added. A precipitate forms, which is allowed to settle to the bottom of the vessel and the supernatant fluid decanted off. We thus obtain a dark brown, sticky mass. This insoluble residue contains antigenic lipoids and its strength must be estimated.

Ethereal or alcoholic solution of the antigenic lipoids is made, strips of filter paper impregnated, the strips titrated and that dimension used in the test "which does not of itself cause much inherent inhibition of hæmolysis, but inhibits hæmolysis completely with syphilitic serum."

To carry out the test for one person six small test tubes (10 by 1 cm.) are required. In addition three fine capillary pipettes, two Wright's curved tubes for taking the serum of the normal control and of the suspected person, two 1 c. c. pipettes graduated in tenths (one for measuring complement and one for red cell emulsion). Have at hand a small scissors and a ruler for measuring the required lengths of antigen or of amboceptor paper. Complement taken with ordinary care from a guinea pig's heart and mixed in the proportion above indicated should be on hand, and for a single test 1 c. c. had better be ready. The complement mixture should be perfectly clear, of course, as also the several sera used in the test. All glassware should be scrupulously clean and dry. The red cell emulsion in quantity sufficient for the number of tubes in the test had better be made from a normal person. A syphilitic serum (known to give a positive reaction) can be kept on hand. Number the tubes in a rack from "1" to "6."

When everything indicated above is assembled proceed as follows. Into tubes "2," "4," and "6" place the required length of antigen paper. Next drop into tubes "1" and "2" a drop of the patient's serum from a capillary pipette; into "3" and "4" a capillary drop of known syphilitic serum; and into "5" and "6" a drop of normal serum. Now place in each of the six tubes 1 c. c. of the corpuscle suspension and then into each of the 6 tubes 0.1 c. c. (2 units) of complement mixture. Place the tubes at 37° C. for one hour (or tube

may be placed in water bath for a shorter time). Then take them out of the incubator and add to each the required length of amboceptor paper. Incubate for another period of two hours. In reading the result a marked positive would show complete hæmolysis in tubes "2," "4," "5," and "6" and no hæmolysis in tubes "1" and "3." A frank negative would show hæmolysis in every tube except "3." Doubtful readings are also interpreted.

This test is not practicable for use on board ship. Indeed, the need for its use there is not apparent since primary and secondary lesions could be more easily and certainly diagnosticated in other ways (e. g., in case of primaries by the dark ground illuminator), while men suffering with tertiary and parasyphilitic forms would not be long on board anyway, and the exact diagnosis would perhaps best be left to the hospital. This test is perfectly feasible for use in naval hospitals. We are prepared to carry out the test at the school for those hospitals which so desire. In sending specimens the clear serum had best be sent, as the whole blood, if mailed in a Wright's tube, shows color very quickly in the serum. This is best avoided. One-half c. c. of serum is ample for the test.—SURG. C. S. BUTLER.

A CONCENTRATION METHOD FOR TUBERCLE BACILLI.

J. J. Kinyoun, of the District of Columbia board of health, has modified Uhlenhuth's method of concentrating tubercle bacilli in sputum and feces so as to render it more efficient. It is of great advantage when the bacilli are scarce, and at all times when examining feces for the organism.

The method is as follows:

Two substances are required:

(a) *Antiformin*.

(b) *Aheranc*, called *ligroin* (not necessarily, c. p.).

Kinyoun finds that this ligroin can with advantage be replaced by a mixture of petroleum-ether and xylol or petroleum-ether and toluol (sp. gr. of 0.720), so that he no longer uses the ligroin.

Antiformin is made as follows: Take 908 grams of bleaching powder and 3 liters of water and to each 180 grams of lime add 65 grams of sodium carbonate. Mix thoroughly. Allow this to stand overnight. Filter and test filtrate for chlorine (KI and hyposulphite). There should be about 5.4 per cent of chlorine available. To this filtrate add 7.5 per cent of sodium hydrate and filter. This last filtrate is the antiformin. It can be purchased ready prepared in the market.

How to apply this method of concentration.—Take the feces, sputum, or ground-up tissue and mix in a bottle with not less than 2 c. c. of antiformin. It is necessary that the amount of antiformin added be sufficient to break up and liquefy the sputum, etc.) Add a small amount of ligroin or petroleum-ether mixture and shake thoroughly, either by hand or in a shaking machine. Centrifugalize. After centrifugalizing, the material will show two distinct layers with the ligroin floating on top. At the junction of the oily layer and the

sediment most of the tubercle bacilli will be found, having been carried up by the oil, which is of about their own specific gravity.

Make smears from this.

Fix carefully and stain with Ziehl-Neelsen in cold. (Fixation after this method is rather difficult. It is best to mix a loopful of the material from the intermediate layer with a loopful of Meyer's fixative.)

Decolorize in the usual way and counterstain.

Occasionally between the oil and sediment a soapy material forms, which to a certain extent interferes with the fixing and staining.—SURG. C. S. BUTLER.

A SIMPLE METHOD OF PREPARING SUGAR BROTH MEDIA.

The sugar bouillon is prepared by adding 1 per cent of the sugar to the bouillon, adjusting the reaction to -0.5 , adding 2.5 c. c. of a 1 per cent litmus solution (azolitmin) to each 100 c. c. of media.

The solution is placed in ordinary test tubes and sterilized.

If the organism in culture does not produce gas or acid the media remains blue; if acid is produced it turns red; if both acid and gas are produced the media turns red and bubbles appear on the surface. Care must be taken to avoid unnecessary handling of inoculated tubes or the foam will disappear.

This method has a marked advantage over the Dunham or Smith tube because of the ease in filling and handling.

If it is desirable to measure and analyze the gas a Dunham tube may be used.—HOSPITAL APPRENTICE, FIRST CLASS, C. W. ELYEA.

A SIMPLE METHOD OF PREPARING BANG'S SOLUTION.

The preparation of Bang's copper solution was described in the Bulletin, vol. 3, No. 3, p. 274.

In preparing the solution according to these directions it was found difficult to keep all the ingredients in solution until the volume was made up to 2,000 c. c. As a result a very inconstant solution resulted, which made it necessary to standardize the solution each time it was made up. The following modification in the method of preparation gives very constant results:

(a) Dissolve 500 grams potassium carbonate, 500 grams potassium sulphocyanate in about 1,500 c. c. of water. Dissolve 100 grams potassium bicarbonate in about 300 c. c. of water, using heat in both processes. Mix the two solutions, filter if necessary, and bottle.

(b) Dissolve exactly 25 grams well-selected copper sulphate crystals in 200 c. c. of water, using heat if necessary. Bottle.

Keep these as stock solutions and use in the following way: Into a 500 c. c. measuring flask pour about 400 c. c. of solution (a). Then add carefully from a pipette exactly 50 c. c. of solution (b). Fill flask to mark with solution (a), mix well, and bottle.

When prepared in this way the solution will be found to be of a constant strength, and standardization is unnecessary.—HOSPITAL APPRENTICE, FIRST CLASS, J. P. PORCH.

BASSETTE-SMITH, P. W., R. N., fleet surgeon. **The diagnosis of syphilis by some laboratory methods.** Brit. Med. J., Aug. 14, 1900, p. 377.

That chancroids and syphilis are diseases of frequent occurrence in the British navy may be seen in the following summarized official returns:

In 1906 there were 1,672 cases of chancroids, of which 13 were invalided, giving a ratio of 15.4 per 1,000 of the effective force. Of primary syphilis there were 1,888 cases, of which 10 were invalided out of the service, with a ratio of 17.4 per 1,000. Of secondary syphilis there were 3,153 cases, with 631 invalided and 4 deaths, with an average of 29.1 per 1,000 of effective force.

For 1907 there were chancroids, 1,905 cases, or a ratio of 17.5 per 1,000; primary syphilis, 1,461 cases, or a ratio of 13.4 per 1,000 of effective force; secondary syphilis, 3,215 cases, with 133 invalided out of the service and 6 deaths, giving a ratio of 29.5 per 1,000 men.

British naval medical officers seem to be fully alive to the fact that the methods of combating the disease must consist in (1) an early diagnosis and (2) in a well-regulated administration of antisyphilitic remedies until the cure is complete.

Bassette-Smith, by means of the microscopic method of diagnosing syphilis, found spirochætes in 38 per cent of typical cases and never in chancroid infections. By means of the method of Wassermann, Neisser, and Bruck, or the complement-fixation method, positive results were obtained in 83 per cent in primary true syphilis; 96.5 per cent of secondary syphilis; in 57 per cent of tertiary syphilis; and in only 14 per cent of cases with a history, but without any symptoms; and, finally, in 60 per cent of parasyphilitic cases.

An early diagnosis of syphilis was also made in many cases of men admitted for chancroids in whom a double infection was present, as shown by the occurrence of secondary symptoms subsequently. After testing the values of the original method by Wassermann and of various modifications of this method, Bassette-Smith concludes that the original method is the most accurate and reliable. His conclusions take the following forms:

CONCLUSIONS.

- (1) That almost all cases with evident primary syphilis give a marked reaction, this being obtained as early as the fourteenth day after infection in some cases.
- (2) That in many cases admitted for chancroids the presence of a double infection was early indicated by the test.
- (3) That in almost all cases of secondary syphilis, with or without symptoms at the time, positive results were obtained.
- (4) That in the late secondary stages or tertiary manifestations the results are more variable.

(5) That in about 50 per cent of parasyphilitic cases a positive reaction is present.

(6) That in cases without symptoms and, generally, after much treatment, but with an undoubted history, a minority reacted.

(7) That the reaction is specific for syphilis as far as other venereal diseases are concerned.

(8) That mercurial treatment did not appear to prevent the reaction when symptoms were present.

(9) That by this method we have a valuable aid in the diagnosis of syphilis, deciding the nature of many difficult cases and early indicating the need of specific treatment.—MEDICAL INSPECTOR H. G. BEYER.

CHEMISTRY AND PHARMACY.

Pharmacists E. R. NOYES and P. J. WALDNER, U. S. Navy.

FOCKE, Doctor. *Der jetzige stand der physiologischen Digitalisprüfung, ihr wert für die Praxis und für die Forschung.* (The present status of the physiological standardization of digitalis, its value in practice and for research.) *Archiv der Pharmazie*, band 247, heft 7.

Focke declares that the value of physiological standardization of digitalis depends upon the fact, demonstrated to his satisfaction, that tests of the leaves which show differences in value in frogs show the same relative differences in value in man and vice versa. He establishes a value figure, or quotient, by the following method:

Body weight of frog

Dose of 10 per cent infusion \times period required to produce stoppage of the heart.

The author states that tests made by Sophie Lutzkaja with a 0.03 per cent solution of pure digitoxin gave a value figure which practically approximated that obtained by employing the above method and formula. It will be noted that Focke used an infusion of the drug, whereas Lutzkaja employed a solution of digitoxin. Similarity of their results is probably explained by the fact that digitalis contains a body called digitalein, a water-soluble principle, not yet well defined, the action of which is said to closely resemble that of digitalis and which Kiliani showed to be present, as regards quantity, in about the same proportion as digitoxin. Digitoxin being insoluble in water must therefore have been absent in Focke's infusion. The opposite character, as regards solubility, of the active principles of digitalis and the as yet vague knowledge of the exact nature of digitalein constitute the difficulties in the accurate standardization of the whole drug.

[As numerous authorities advocate the administration of the recently powdered leaves as giving the full physiological effect, and it being well established that the presence of moisture has much to do with the quality of the drug, it is possible that further investigation

will show that the glucosides present in the carefully dried leaves undergo change in presence of water. If this be so in the case of absorbed water, it seems reasonable to suppose that an infusion represents an extraction of the drug in which the constituents are altered.]—(P. J. W.)

BRADY, WILLIAM, M. D. *The administration of drugs with regard to absorption and elimination.* New York Med. Jour., January 29, 1910.

Brady contends that the degree of absorption and rapidity of elimination of drugs should be given more thought than is customary, as indicated by the almost invariable "ter in die" instructions. The author believes that a deeper study of this matter would lead to greater confidence in drugs on the part of both physician and patient. Employment of compressed tablets is generally condemned; many of them are irritating to the stomach, such as potassium iodide, potassium bromide, chloral, and others, while a goodly number "may be found in the stools none the worse for the journey through the intestinal tract." The following quotations are of special interest:

A familiar illustration * * * is the compressed tablet known as "Nitroglycerin comp." * * * The label reads nitroglycerin, belladonna, strophanthus, and digitalis. Supposing for the moment these ingredients are all present in active form, what happens when the tablet is administered? About three minutes after administration the nitroglycerin begins to act; perhaps twenty minutes later the belladonna gets busy, and in a little less than an hour (?) the strophanthus joins in; the three work together for only a brief moment or two when the nitroglycerin ceases to act; at the end of three hours the belladonna does likewise, leaving the strophanthus to act alone for a number of hours longer. Some time during the succeeding forty-eight hours, long after the strophanthus has lost its effect, the digitalis takes hold and labors alone for perhaps several hours more. It is plainly a "shotgun" of very scattering aim and one that we should very likely never have been tempted to use were the ammunition not furnished in the attractive form of prettily coated, low-priced, convenient little compressed tablets.

Pawlow has shown that oil markedly inhibits gastric digestion. Olive oil or castor oil should be given apart from meals; cod-liver oil, being digested in the duodenum, should follow the meal by two hours. The pure oil is usually preferable to the cod-liver oil emulsions; given from a heated spoon in doses of one-half to 1 ounce (15 to 30 c. c.) after dinner and at bedtime or only at bedtime, it almost always agrees. Unless a patient takes from 1 to 2 ounces (30 to 60 c. c.) daily we are wasting time.

Amyl nitrite is instantaneous in action and its effect lasts only about twenty minutes; it is therefore useful only for emergencies. Nitroglycerin acts in three minutes by mouth and its action continues about forty-five minutes; it is never necessary to give it hypodermically if the mouth can be opened. Sodium or potassium nitrite is absorbed in about eight minutes, from the stomach, and it is eliminated in three hours; it produces much less throbbing in the head than does nitroglycerin, and, unlike the latter, is very stable; hence it may be well given in tablet triturate if desired.

Ammonium salts exert their influence for about three hours and should be given accordingly, not three times a day.

Cocaine, systemically, requires to be repeated every two hours to maintain its effect. So used in exhausted persons who are taking insufficient nourishment, it is an excellent temporary stimulant with which to tide over a serious crisis.

Since ether is largely eliminated in the stomach a patient undergoing operation who will drink two or three glasses of water just prior to anesthesia is not nearly so apt to vomit on recovery, because the ether is diluted and rendered unirritating, shock is prevented, elimination through the bowels and kidneys is favored, and, above all, the distressing sense of emptiness that ordinarily invites nausea is relieved.

Ergot, given by mouth, is absorbed and acts in fifteen minutes, but the effect continues only half an hour, so that semihourly doses are required in serious cases. Ergotin is very unreliable and unsafe to use in the dangerous emergencies for which we prescribe ergot. Ergotele, ergone, and similar products, although convenient for hypodermic use, are in no way superior to an aqueous solution of the extract of ergot (12½ per cent) prepared under aseptic conditions and preserved, if desired, by the addition of a drop or two of chloroform or cresol. In a series of hospital patients in which the writer had occasion to employ these products, it was found that ergotele caused deep sloughing, ergone was painful but caused no sloughing, and the simple solution of the extract proved least irritating of all while it was physiologically satisfactory. Giving ergot every two or three hours in uterine hemorrhage is inviting disaster. Half-hourly doses are plainly indicated.

Hexamethylenamina (U. S. P.) is eliminated in the cerebrospinal fluid half an hour after administration in sufficient amount to inhibit staphylococcus growth; the drug is indicated, therefore, in severe head and spinal injuries, in meningitis, and in diseases like typhoid fever, where meningitis may develop as a complication.

Bromides, absorbed and eliminated slowly, should be given but once daily, and when long continued should be omitted for a few days in every month: they are best given in milk, after meals.

Iodides, absorbed and eliminated rapidly, should be given every four hours at first to the point of tolerance; some of the iodide accumulates in the body in organic combination with cell protoids, consequently, when the point of tolerance is reached, the drug should be entirely cut off for a few days, then continued in considerably reduced doses given once or twice a day. Iodides are best given in milk about an hour after meals. After prolonged use, all trace of iodine disappears from the urine within five days from the last dose: bromides, on the other hand, require weeks for elimination under like circumstances.

To obtain the full benefit of the administration of drugs in disease it is quite as necessary to know the frequency as it is to know the quantity of dosage. This knowledge may be gained only from a careful study of the absorption and elimination of drugs and observation of their effect on cases in actual practice. Possession of such knowledge renders the physician more self-confident in his management of the sick.—(P. J. W.)

SCHULTZ, W. H. **Relative physiological activity of some commercial solutions of epinephrin.** Hygienic Laboratory Bulletin No. 61.

After presenting a brief review of previous work on the standardization of commercial preparations of epinephrin by Houghton, Cameron, Hunt, Sollman, and Brown, and other investigators, the author states that the most accurate method of physiological assay at present known is the relative rise of blood pressure following alternate and successive intravenous injections of a 1:50,000 solution of pure epinephrin base and an equivalent amount of the drug to be standardized. Other vaso-constrictor stimulants might also be compared with it and referred to in terms of the base. The preparation and preservation of a standard solution of the base is described. It is interesting to note that twice the amount of hydrochloric acid necessary to form the chloride is used. Gunn and Harrison have demonstrated that solutions prepared with this proportion of HCl are twice as active as those made with the minimal amount and show less color with age. The author has tabulated the results of investigations showing rises of blood pressure following intravenous injections of various commercial solutions of epinephrin (adnephin, adrenalin, adrin, supracapsulin, suprarenalin) compared with the standard solution of epinephrin base. In each case an amount (1 c. c.) of a diluted solution of the standard was injected into the right and left saphenous veins of a dog and the resulting rise of blood pressure measured by means of a mercury manometer. The writer states that dogs yield the most constant and uniform results in testing physiological activity of epinephrin and epinephrin-like compounds. The keeping qualities of solutions highly diluted (1:10,000–1:200,000), even with precautions taken to guard against this, deteriorate rapidly. A summary of results noted shows changes in color and physiological activity undergone in a course of ten days in 1:10,000 solutions of different commercial epinephrin solutions to vary greatly in their keeping properties. The value of a solution can not always be judged by the color; various factors, "sulphides and deoxidizing agents," may be present which may prevent any great change in color, yet the solution may have undergone a change which would lessen its physiological action. Should the solution, however, contain nothing "to alter or retard the normal color that usually develops in an epinephrin solution upon standing, the strength of the solution is roughly in inverse proportion to the degree of color until the decomposed material begins to precipitate out."

Of the seven different brands of epinephrin examined, only three possessed an activity that equaled the standard. The other solutions varied anywhere from 3.75 to 71 per cent of the required activity. As is brought out in a more graphic manner in this table, some of the solutions were, from the physician's point of view, worthless, and perhaps even dangerous. Certain solutions,

though showing a high degree of activity upon opening the original package, quickly deteriorate in spite of the extra precautions taken to guard against conditions known to further this process. On the other hand, some of the preparations now upon the market made by American concerns are of the very highest quality.

TABLE XV.—*Tintometer determinations of color observed and the relative physiological activity of the original 1:1,000 solutions.*

Laboratory number of solution.	Commercial name of solution.	Manufacturer's serial number.	Color of solution.	Proportion of—		Precipitate present.	Relative physiological activity expressed in per cent of A.
				Red.	Yellow.		
A ^a	Epinephrin		Red-orange	0.10	0.05	None	100.00
B ^d	Adnephrein	60802 FR	Yellow-orange	.20	.40	None	50.00
B ^m	Adnephrein	62912 ER	Yellow-orange	.20	.40	None	50.00
C ^d	Adrenalin	1360016	Yellow-orange	.52	.70	None	100.00
C ^m	Adrenalin	1335177	Yellow-orange	.90	1.10	None	100.00
D ^d	Adrin	A 76797	Yellow-orange	.22	.72	None	50.00
D ^m	Adrin	102009	Yellow-orange	5.58	12.70	Abundant	3.75
E ^m	Caprenalin	1302244	Red-orange	2.10	2.00	Abundant	25.00
F ^d	Supracapsulin		Yellow-orange	.12	.16	None	100.00
F ^m	Supracapsulin		Red-orange	.25	.24	Trace	100.00
G ^d	Suprarenalin	670074	Yellow-orange	.15	.16	None	66 to 71
G ^m	Suprarenalin	670065	Yellow-orange	.82	.84	None	66.66
H ^d	Suprarenin synthetic.	{SA 2306 F 13452	Red-orange	.24	.21	Trace	50.00
H ^m	Suprarenin synthetic.	{IH 2209 T 57630	Orange	.50	.50	Some	50.00

^a Solution A made up on morning of experiment, from a pure sample of natural base the optical activity of which is $[\alpha]_{\text{D}}^{26.4^{\circ}} = -53.40^{\circ}$.

^b Series "d" bought directly from manufacturers or from their agents.

^c Series "m" bought on the open market from a reliable druggist.

^d The figures to the right of the decimal point are given simply because the calculations come out thus, and not because the fractional parts have any practical value.

(HOSP. STD. CHARLES SCHLAFFER.)

GOODMAN, E. H., M. D. Influence of hydrogen peroxide on hydrochloric acid secretion. N. Y. Med. Jour., November 6, 1909.

In a number of cases of hyperchlorhydria, as confirmed by the composition of the gastric juice after the administration of Ewald's test meal, the patients were given from 1 to 2 drachms of 3 per cent hydrogen peroxide in a tumblerful of water half an hour after meals. After a period of one to three weeks the symptoms had disappeared or abated. At this time, after the giving of an Ewald test meal in which 300 c. c. of 0.5 per cent hydrogen peroxide solution has been substituted for the tea, the gastric contents showed a marked reduction in both the total acidity and the free hydrochloric acid. The results obtained in a series of fifteen cases are given, each case showing this decided improvement. The author cautions against the use of too strong a solution of the hydrogen peroxide, as it too greatly reduces the hydrochloric acid.—(E. R. N.)

GOODMAN, E. H., M. D. The value of alimentary levulosuria in the diagnosis of hepatic cirrhosis. Jour. A. M. A., December 18, 1909.

The article gives the results obtained in a study of the metabolism of levulose in a number of cases of hepatic and other diseases. After the administration of 100 grams of levulose the urine was collected, in hourly portions, for four hours. The appearance of levulose in the urine within from one to four hours was noted in each of the twenty cases diagnosed as cirrhosis, in the one diagnosed as fatty degeneration, one of carcinoma of gall bladder, one of catarrhal cholangitis-cirrhosis, and one of diabetes mellitus. Under similar conditions levulose could not be found in any of the six cases of chronic passive congestion nor in a case of syphilitic cirrhosis.

Although in the majority of the cases the diagnoses could not be confirmed by post-mortem examination, yet the author believes that, while not indicative of any specific lesion of the liver, levulosuria is most frequently observed in cirrhosis, and that its appearance, early or late, indicates a severe or mild degree of the condition, and also that it is very useful in distinguishing between cirrhosis and chronic passive congestion.—(E. R. N.)

MAGUIRE, R., M. D. Oxaluria and treatment of calcium oxalate deposit from the urine. Lancet, November 6, 1909.

The author reviews the theories of the formation of oxalate, but the greater part of the article is devoted to the description of a case in which calculus within the ureter was suspected and in which he believes he accomplished its solution within the body through the administration, over a period of several weeks, of dihydrogen sodium phosphate, basing his claim to such a result upon the disappearance of all symptoms and his ability to dissolve, without the body, the greater part of an oxalate calculus by continuously passing over it a solution of phosphate, the strength of which corresponds to the phosphate content of the urine during the administration of the salt.—(E. R. N.)

PATHOLOGY AND BACTERIOLOGY.

Passed Asst. Surgs. O. J. MINK and F. M. SHOOK, U. S. Navy.

HARTWELL and STREETER. Bacillus of acne. Boston Med. and Surg. Jour., December 16, 1909.

The authors give the history of the bacillus acnes and describe it as a rather short, rather plump, Gram positive bacillus. It is often irregular and beaded and shows branching forms in cultures rather frequently. It does not form spores and grows on ordinary media

if under anaerobic conditions. If the pus is smeared on glucose agar slants and placed under anaerobic conditions, fair-sized, raised, grayish-white colonies smaller than those of the *Staphylococcus* appear in three to five days. It is considered to be identical with the bacillus of Gilchrist.—(O. J. M.)

KENDALL, A. I. Some observations of the study of intestinal bacteria. *Jour. Biol. Chem.*, vol. 6, No. 6, 1909.

The author outlines certain general principles applicable to the determination of the more important types of bacterial activity in the intestinal tract and for the isolation of the principal agents concerned in these processes.

These procedures are based on the correlation which exists between diet, bacterial flora, and the end products of bacterial activity which appear in the urine. The nature of the diet practically determines the dominant types of intestinal bacteria, and those organisms in turn acting upon the digestive products of the diet elaborate the end products of their activity which appear in the urine.

With the exception of a few anaerobes, the majority of the prominent types of the normal flora which develop on a protein diet grow luxuriantly in media free from carbohydrates, while those developing on a carbohydrate regimen grow poorly or even not at all unless carbohydrate is present. Hence by inoculating portions of the mixed fecal flora with gelatin and milk and observing the degree and rapidity of peptonization it is possible to form a judgment of the character of the proteolytic flora. On the other hand, through the use of media containing carbohydrate and particularly the acid dextrose broth, one obtains a fairly specific enrichment of the acidophile flora characteristic of the carbohydrate regimen.

Furthermore, through the use of these selective media it is possible to form a judgment of the completeness of the bacterial response to the nature of the diet. For example, if the experimental animal is on a carbohydrate regimen the presence or absence of growth in protein media will indicate the presence or absence of proteolytic bacteria, since the acidophilic organisms do not grow well in these media and can not therefore inhibit the growth of these organisms. Conversely, with a protein diet the presence or absence of acidophiles may be determined by inoculating the mixed fecal flora into acid dextrose broth which is unfavorable for the development of the proteolytic types. These determinations may be made roughly quantitatively for the different types by inoculating definite amounts of the mixed fecal flora into appropriate media.

The end products of bacterial activity which appear in the urine are important for two reasons: They indicate the types of bacterial activity in the intestinal tract, and the reproduction in artificial media by pure cultures derived from the intestinal flora furnishes strong presumptive evidence of the participation of these organisms in the process.—(O. J. M.)

ANDERSON, J. F. The presence of tubercle bacilli in the circulating blood in clinical and experimental tuberculosis. Hygienic Laboratory Bulletin No. 57.

The author gives the following summary and discussion at the close of his article:

An examination of the above experiments shows that there were forty-seven cases of pulmonary tuberculosis with bacilli in the sputum and one case of joint tuberculosis in which the bacillus was not found. Cultures, smears, and animal inoculations from the blood in these cases did not show the tubercle bacillus in a single instance.

Glycerin-potato cultures, animal inoculations, and smears were made in thirty-five of the forty-eight cases from the sediment obtained from placing the citrated blood in the ice chest for twenty-four hours. In only one of these cases did the smears show a bacillus of the morphology and staining reaction of the tubercle bacillus, and in this case the animal and culture results were negative.

If tubercle bacilli had been present in sufficient numbers to be detected in the smears, it would certainly seem that they should have been detected in more than one instance in a series of forty-eight cases, in forty-seven of which the bacillus was found in the sputum. In most of these cases as much as 2.5 c. c. of blood were inoculated into guinea pigs with negative results.

The glycerin-potato cultures were uniformly negative. That this was not due to the bactericidal action of the blood was shown by an examination of the blood of two rabbits, experimentally infected, in which the bacillus was demonstrated by smears, cultures, and animal inoculations.

Eight rabbits were infected experimentally with the tubercle bacillus, six of which showed the naked-eye appearances of tuberculosis at autopsy. From the blood of these six the tubercle bacillus was grown in three cases and the results from animal inoculation were positive in four cases, while the smears were negative in all six cases.

Of the human cases an acid-fast bacillus was found only once and this was in citrated sediment which had been allowed to stand in the ice box over night. This was probably not the tubercle bacillus, as cultures and animal inoculation were negative, although the bacilli were present in very large numbers. The fact that the man from whom the blood was taken was a stableman by occupation suggests the possibility that the skin may have been contaminated with a harmless acid-fast bacillus derived from hay or straw.

The almost constant negative results in examining smears from the blood of rabbits which was known to contain the tubercle bacillus would indicate that the method is of little value as an aid in the diagnosis of tuberculosis.—

(O. J. M.)

ROSENAU, M. J. **The viability of the tubercle bacillus.** Hygienic Laboratory Bulletin No. 57.

The work is summarized as follows:

We have no easy way of determining the death of the tubercle bacillus: its virulence fades before it dies. The criterion of death depends upon animal experimentation.

The tubercle bacillus may be classed with the nonspore-bearing organisms so far as its virulence is concerned.

It is doubtful whether the waxy substance protects the bacillus against harmful influences to any unusual extent.

The thermal death point is 60° C. for twenty minutes. This is much less than was once considered.

Further work upon the viability of the dried tubercle bacillus in dust, sputum, etc., may change our views as to its hardness and danger under these conditions.

The comparatively short life upon artificial media contrasts strangely with the long life claimed for it under unfavorable conditions.

Failure to recognize the lesions produced by the dead tubercle bacillus is responsible for some of the false conclusions reached by the experimenters upon this subject.

In all cases where the lesions in the test animal are doubtful inoculations into secondary animals are necessary to determine whether we are dealing with living or dead tubercle bacilli.—(O. J. M.)

HYDE, J. N., M. D. **The pathology of pellagra.** Am. Jour. Med. Sciences, January, 1910, p. 17.

The author summarizes the pathological changes as follows:

The fruit of pathological research in pellagra serves to illustrate in a conspicuous manner the marked absence of any constancy in the changes wrought by the disease. The earlier cutaneous alterations are similar to those found in the exudative erythemas, while in the terminal stages the microscopic picture is practically that presented in the senile skin. Depending on the type of the inflammatory reaction and the stage of the process when the examination is made, the histological changes vary from those found in the simple erythema to those seen in marked bullous dermatitis. Still later, atrophy of the papillae and sclerosis of the vessels of the corium with hyperpigmentation and hyperkeratinization of the epidermis are found, the latter identical with those found in the senile skin. The parenchymatous neuritis of cutaneous nerves recorded by Déjerine has not been confirmed by other observers.

Scheube, Sandwith, and Tuzek agree that in many cases there is pigmentation of many of the viscera, wasting of the muscular and fatty tissue (especially atrophy of the muscular coats of the intestines), brown atrophy of the heart, atheroma of the larger vessels, hepatic enlargement, splenic shrinkage, fragility of the ribs (Lombroso), cirrhotic changes in the kidneys, and, as respects the nervous system, either no perceptible changes, or in the brain, cord, and meninges evidences of chronic inflammation, subarachnoid hemorrhages, cerebral atrophy, and symmetrical sclerosis of the posterior columns, especially those of Goll. Occasionally the postero-lateral columns in the dorsal region are similarly involved. Marie believes that these cells are, in general, primarily involved.

Harris ascribes the variability in the recognized organic lesions to the extreme chronicity of the disease, and to the further fact that most post-mortem observations have been made in subjects who were for a long time victims of the malady. His observations include, besides those enumerated above, atrophy of the pancreas, softening of the cords, signs of Belmondo's "meningo-myelitis acuta," with marked degenerative changes in the myelin-sheaths of the nerves, of the nerve cells of the gray substance, and of the ganglia. Peripheral nerve changes have not been recorded.—(F. M. S.)

LAVINDER, C. H., U. S. Public Health and Marine-Hospital Service. **Pellagra.** Virginia Medical Semimonthly, vol. 14, No. 332, p. 468.

After a review of the literature of the blood findings, together with a discussion of his investigations of the blood findings of twenty-four cases of pellagra at the State Hospital for the Insane, Columbia, S. C., the author summarizes his findings as follows:

(1) That there seems to be present in pellagrins a fairly constant secondary anemia, usually not of a severe type, with corresponding qualitative changes in red blood cells.

(2) That leucocytosis is rarely seen in pellagra, and that this is probably not a phenomenon of uncomplicated pellagra.

(3) That the results obtained by various workers on differential leucocyte counts are very discordant, and that conclusions should be drawn therefrom with much hesitation.

(4) That nothing resembling a protozoal parasite has been reported as observed in the blood of pellagrins.

(5) That I have found, in a limited experience, the blood of pellagrins in South Carolina uniformly sterile in cultural work and not infective for ordinary laboratory animals; and that I have not been able to isolate Tizzoni's micro-organism.—(F. M. S.)

HYDE, J. N., M. D. **The Wasserman reaction in pellagra.** Am. Jour. Med. Sciences, January, 1910, p. 17.

Howard Fox, after an examination of thirty cases of pellagra in Columbia by the Noguchi modification of the Wasserman test, found that in pellagra there was no positive reaction. When weak reactions were obtained they were without difficulty distinguished from those obtained in syphilis and lepra.—(F. M. S.)

Kiss, A. **Zur theorie der Wassermanischer reaktion.** Gyogyaszat, 1908, S. 782.

The author occupied himself first with the question as to what degree the Wasserman reaction is influenced by the presence of salts. Salt solutions prevent the solution of red blood cells. The protective power of an isotonic salt solution is, however, evidently less than that of serum, as there are present in serum besides the salts other pro-

protective substances. A 1.35 per cent NaCl solution gives the same protective power as serum. If the concentration of the salt solution is increased still more, a point is reached where the protective power is greater than that of the serum. The investigator demonstrated that the immune body was bound by a 1.85 per cent solution of NaCl; the complement, however, was not bound. Hypotonic solutions of salt lessen the power of resistance of the red blood cells, even though they do not cause hæmolysis.

The Wasserman reaction is given not only with serum but with salt solution, whose protective power is similar to that of serum. This is the case when red blood cells of cattle are used with a 1.35 per cent salt solution.

In hæmolytic experiments one should not speak of physiological or isotonic solutions. The author suggests the term "indifferent salt solutions."

There is necessary in the Wasserman reaction a certain optimum of the serum content of the reaction mixture. Two or three times the amount of normal serum will produce indefinite results.

Against the conclusion that the complement is only mechanically bound the author emphasizes the fact that many different toxic influences prevail over the complement. The substance through which the complement is bound is contained in the organ extract itself, the luetic or other serum having only the power to cause the complement-binding compound to fix the complement.—(F. M. S.)

WILSON, L. B., and MACCARTY, W. C. The pathological relationships of gastric ulcer and gastric carcinoma. *Am. Jour. Med. Sciences*, December, 1909.

The following report is based on the study of specimens from gastric and duodenal resections and excisions for ulcer and carcinoma, by W. J. and C. H. Mayo, from January 1, 1905, to April 1, 1909. In five of the cases the material was obtained at autopsy from patients on whom gastro-enterostomies had been done for ulcer or carcinoma, and from whom no material had been removed at the operation. These autopsies, however, were all made within one hour after the death of the patient; consequently all the material was quite fresh when placed in fixatives.

The total amount of material studied comprised specimens from 218 cases. Eight of these were from the duodenum, and were all simple ulcers. The remaining 210 were from the stomach. Of these 47 were ulcers without suspicion of carcinoma: 2 were sarcomas, 2 adenomas, and 1 a diverticulum. Of the remaining 158 cases from the stomach, 5 were ulcers with enough microscopic appearance of aberrant epithelial proliferation to place them in the doubtful class as possible transition cases. Of the remaining 153 cases, which

were undoubted carcinoma, 109 (71 per cent) presented sufficient gross and microscopic evidence of previous ulcer to warrant placing them in a group labeled "carcinoma developing on preceding ulcer." Eleven other cases (7 per cent) showed considerable evidence of precedent ulcer, but not sufficient to warrant placing them in the previous group. In 33 cases (22 per cent) there was relatively small or no pathological evidences of precedent ulcer.

It is unnecessary to review the enormous literature of this much discussed subject. For years the pendulum of opinion swung back and forth, and it has been only within the last decade that sufficient material from early cases has been collected to give a clear understanding of the facts. The report on specimens removed at operation during that period have practically settled the question as to the very frequent occurrence of gastric carcinoma on the site of previous ulcer. Our excuse for offering these cases at present is to place them on record as one more bit of evidence to clear up a misconception which has done much harm in the past, and which still exists, as is shown by the attitude of the author of the most exhaustive recent work on cancer.

The 109 cases (71 per cent) which present pathological evidence, gross and microscopical, parallel with that shown in detail herewith, that is, large ulcers with scar tissue centers and overhanging borders, deep in the bases of which cancer is present, in almost every instance have unmistakably originated on the lesser curvature of the stomach, the usual site for gastric ulcer. Further, almost every case gives a clinical history suggesting gastric ulcer for a long period of years preceding the relatively short period when the history became that of gastric cancer.

That carcinomas should develop in the edges of gastric ulcers is only what should be expected; the wonder is that the facts should have been so long in being recognized. This has been due to (a) failure to recognize clinically the frequency of gastric ulcer; (b) failure to recognize that gastric cancers are not initially pyloric tumors, but extensions thereto from the lesser curvature; and (c) giving undue weight to observations at autopsies. When the patient has died of gastric cancer, the neoplasm has usually obliterated all gross and microscopic evidence of previous ulcer.

As the pathologist examines stomach specimens from the surgical clinic he constantly observes the various steps in the following sequence:

- (1) Chronic ulcers from the centers of which the mucosa has disappeared, leaving a scar tissue base.
- (2) In the overhanging borders of the ulcer the mucosa is proliferated.
- (3) Deep in the borders many groups of epithelial cells have been nipped off by the scar tissue and are exhibiting all stages of aberrant proliferation with infiltration of the surrounding tissues.
- (4) Metastases are forming in the lymphatics of the stomach wall and adnexa.

A small percentage of cases operated upon are too far advanced to show these steps, and a very small percentage, probably not over 2 per cent, give evidence of rapid aberrant epithelial proliferation and infiltration without any sign of previous ulcer.

Adopting Adami's classification we may therefore correctly designate most gastric carcinomas as "blastomæ originating from unpotential cells of post-natal displacement," although it is probable that a very small number are "blastomæ originating from unpotential cells that assume neoplastic characters without displacement and rapidly assume malignancy."—(F. M. S.)

MEDICAL ZOOLOGY.

Passed Asst. Surg. P. E. GARRISON, U. S. Navy.

KATSURADA, Prof. T., and HASEGAWA, Dr. T. **A study of the development of *Schistosomum Japonicum*.** Sei-i-kwai Med. Jour., vol. 28, No. 10, pp. 459-467. Tokyo, October 31, 1909.

The authors report the experimental infection of one cat and one dog with the Japanese blood fluke, infection taking place through the skin. The work was done in a small Japanese village (Tagami) of 53 houses and 1,262 population, where schistosomiasis was known to prevail.

In 20 of the houses there lived 117 people whose conditions of life were practically identical with those of the other inhabitants excepting that they were employed in cultivating a certain field lying along the river, and most of these 117 were suffering from schistosoma infection. In the early part of the year the field was grown in wheat, but in the early summer it was flooded from the river and planted with rice, the laborers working in the water with bare legs. At this time of year the workers in this field are afflicted with itching of the skin and a dermatitis called "kabure," which is said to be worse at morning and evening. The oxen are said to be likewise afflicted. The field is fertilized with both human and bovine excreta: being very dirty the water is never drunk.

A cat, whose abdomen had been partly shaved, was immersed in the water a half hour daily for three days beginning June 12, its head being held by a yoke which prevented its mouth reaching the water. By July 1 the cat began to gradually grow weak and by the middle of July ova of schistosoma were found in the stools. On July 26, after a period marked by vomiting and complete anorexia, the animal died and autopsy showed the presence of many flukes in the portal system, the portal vein itself being filled with "fully developed miracidia" and male and female worms. Many ova were present in the intestines and liver.

A dog was similarly treated; weakness and extreme emaciation followed and numerous ova appeared in its feces. With difficulty it was kept alive for further experimental purposes.

The authors conclude that infection with *schistosoma japonicum* in man probably occurs by perforation of the skin by the parasite in its miracidial stage, that the large number of parasites found indicates a further reproductive development of the miracidia in the body, and that the worms reach sexual maturity in the body in something less than a month after infection occurs.

They suggest as methods of prophylaxis the wearing of stockings and gloves lined with oiled paper and either the cremation of the

feces of infected persons and animals or its thorough boiling before it is put on the fields.—(P. E. G.)

MATSUURA, Prof. W. **Report of the study on the endemic diseases.** ["**Relation between the *Schistosoma-japonicum* and the endemic kabure.**" "**Report of the study on the invading route of the *Schistosoma japonicum* into the human body.**"] *Sei-i-Kwai Med. Jour.*, vol. 28, no. 11, pp. 469-474.

Matsuura reports upon the results of investigations of the life cycle of *Schistosoma japonicum* carried on independently of those of Katsurada and Hasegawa above noted and covering about the same period (1908-9).

In these investigations the author appears to have shown that infection with the Japanese blood fluke takes place through the skin, that it is etiologically associated with an exanthematic dermatitis called "*kabure*" and furthermore, that he himself, after deliberate exposure to infected water, developed "*kabure*" and later found ova of the fluke in his stools.—(P. E. G.)

GREGG, DONALD, M. D. **Acute trichiniasis without initial eosinophilia.** *Boston Med. and Surg. Jour.*, December 23, 1909, vol. 161, no. 26, pp. 932-934.

The author cites seven cases of trichinosis in the literature in which initial eosinophilia was not found. His own case was an 11-year-old boy admitted to hospital June 4 with provisional diagnosis of typhoid fever; temperature 101, pulse 100, respirations 20; had not been feeling well for a week; history of headache and pain in abdomen; blood examination, smear normal, no leucocytosis, no eosinophilia; Widal and blood culture in bile negative.

On June 17, thirteen days after admission, a piece of muscle taken from the gastrocnemius showed numerous trichinae. Up to this time the patient's blood had been examined four times and showed no eosinophilia or other abnormal condition and on the 18th and 20th further examinations gave like results. On June 22, eighteen days after admission, 10 per cent of eosinophiles were found, and these increased to 15 per cent by the 30th. Eosinophilia was still found present July 8, 12, and 30, but on the 12th counted only 1 per cent.

It was later found that the patient with his sister, who was taken sick about the same time, though at another hospital, had eaten some raw Frankfurt sausages on two occasions, six and thirteen days, respectively, prior to entering the hospital.—(P. E. G.)

Reports of the twenty-first expedition of the Liverpool School of Tropical Medicine. Jamaica, 1908-9. Ann. Trop. Med. and Parasitology, Liverpool, Vol. III, No. 4, November 17, 1909.

This entire number is given to the two reports following:

NEWSTEAD, ROBERT, M. Sc., A. L. S., etc. Section I, Medical and Economic Entomology, pp. 421-470, plates 13-15.

The greater part of this report deals with the ticks of Jamaica, which are described as a veritable plague to cattle, horses, domestic fowls, and to man himself. The following species were found:

Texas fever tick, *Margaropus annulatus*, var. *australis*; large red tick, *Rhipicephalus sanguineus*; *R. bursa*; tropical horse tick, *Dermacentor nitens*; silver tick, *Amblyomma cajanense*; pimento tick, *A. maculatum*; bulfrog tick, *A. dissimile*; chicken fever tick, *Argas persicus*; lizard tick, *Aponomma* sp.

Considerable space is given to the eradication of ticks, especially to the active rôle played by the native blackbirds (*Crotophaga ani* and *Quiscalus crassirostris*), as evidenced by the number of ticks found at autopsy in the birds' stomachs. Domestic fowls also were found to keep down the number of ticks, while lizards and frogs were without effect.

Rotation of crops, burning of pastures, and cattle dips and sprays are discussed as means of fighting the pest.

The remainder of the report deals with several species of flies, of which the following may be mentioned:

Chrysomya (comptosmyia) macellaria, valuable as a scavenger, but may produce myiasis in man and animals.

Lyperosia irritans, the cattle "hornfly" of the United States.

Stomoxys irritans, the "stable fly."

Chrysops costalis, a small yellow horsefly.

Atylotus jamaicensis Newstead, 1909, is described as a new species.

PROUT, W. T., C. M. G., M. B., Ch. M. Section II. Malaria, pp. 471-552, plates 16-18.

This report was prepared with a view to local rather than general interest. The conditions as regards malaria in Jamaica are shown to agree substantially with those in other tropical regions.

The following points may be mentioned:

An annual average malarial death rate of 4.4 per 1,000 for the past ten years.

Nearly one-fifth of the total deaths are due to malaria.

Admissions to hospitals for malaria during the past four years have increased 55 per cent, while admissions from other causes have increased only 26 per cent; over 33 per cent of total admissions during this period were for malaria.

The annual loss of labor from malaria among indentured coolies on certain estates amounted to 16.9 out of every 100 working days.

The average spleen rate among children examined was 26.3 per cent.—(P. E. G.)

GAGE, JOHN G., M. D. A case of amebic enteritis with *uncinaria*, *trichocephalus* and *trichomonads*, showing results of treatment after four years. New York Med. Jour., December 4, 1909, pp. 106-109.

Gage gives the full clinical history of a case of amebic dysentery of long standing, which was successfully treated and gave no return of symptoms after four years. The case is probably of more present interest in the fact that treatment with ipecac (ipecac powder, 7 grammes in one-half gramme boluses coated with salol, at intervals of one-half hour) seemed to effect a prompt and permanent cure after prolonged courses of rectal irrigations had failed.—(P. E. G.)

BRUCE, Col. Sir DAVID, C. B., F. R. S., HAMERTON, Capt. A. E., D. S. O., BATEMAN, Capt. H. R., R. A. M. C., and MACKIE, Capt. F. P., I. M. S. (Sleeping Sickness Commission of the Royal Society, 1908). The development of *Trypanosoma gambiense* in *Glossina palpalis*. Jour. Roy. Army Med. Corps, vol. 14, No. 2, February, 1910.

In 1903 the Sleeping Sickness Commission of the Royal Society reached the conclusion that the carrying of infection from a sleeping sickness patient to a healthy person was a mechanical act, requiring no previous development of the parasite in the fly, and the power of so conveying the infection was lost to the fly forty-eight hours after it had fed on the infected person.

The present paper reports the results of a further investigation of the matter which has reversed the former opinion of the commission and has seemed to demonstrate conclusively that, under certain unknown conditions, *T. gambiense* does undergo development in *Glossina* and the fly may transmit the infection for seventy-five days after feeding on an infected animal, with the possibility of mechanical transmission excluded. Kleine had already shown (1908) that *Glossina* could transmit *T. brucei* some fifty days after feeding upon an infected animal.

It appears from the experiments reported that only under certain unknown and seemingly rare conditions is the fly capable of thus serving as intermediate host to the developmental stages of the *Trypanosoma*, and to this the authors attribute the failure to notice the fact throughout the course of fifteen years of experimental research. They hold that while it has been proven that an occasional fly is capable of thus carrying the parasite for one hundred days or longer, it occurs too seldom to be the common manner of transmitting the disease, and that immediate mechanical conveyance of the *Trypanosoma* by the fly must still be considered the usual method by which the infection is spread. A summary of the experiment follows:

(1) On March 5, 1909, sixty *Glossina palpalis* caught on the lake shore were placed in two cages, thirty in each. The flies were fed on two infected monkeys

for two days. They were then starved for seventy-two hours to get rid of mechanical transference. The following five days they were placed on a healthy monkey, and every successive period of five days, or thereabouts, on a fresh monkey, up to eighty-six days, when the experiment came to an end. The result was that the first two monkeys remained healthy, but that all the following monkeys up to seventy-five days became infected with *T. gambiense*.

(2) If seven days be deducted for the incubation period, then the flies first become infected eighteen days after their first feed on an infected animal.

(3) There is some evidence that among the sixty flies only one was infective. Fifty-four days after the beginning of the experiment each cage was placed on a separate monkey. Up to that time both the cages of flies had been fed on the same animal. Cage A contained, after fifty-four days, eleven flies. Cage B, four flies. Cage A continued to infect monkeys for twenty-one days more, making a total of seventy-five days. Cage B did not infect. Again, as was natural, the flies gradually died off during the experiment, and as each fly died it was carefully dissected and examined for trypanosomes. Not a single trypanosome of any kind whatever was seen in any dissected fly up to seventy-five days, when a fly died in Cage A which was found to be swarming with trypanosomes similar to *T. gambiense*. After the death of this fly, Cage A ceased to be infective, and when the experiment was stopped the remaining flies were killed off and dissected, but among them not a sign of a trypanosome could be seen. In the same way the flies remaining in the noninfective Cage B were examined, with a similar negative result.

(4) Here follows an interesting and unique observation. A tiny drop of fluid taken from the gut of the seventy-five-day fly injected under the skin of a monkey gave rise to sleeping sickness after an incubation period of eight days. This, so far as we are aware, is the first time this has been recorded.

(5) It will be seen from the detailed experiment that the flies were starved for three days between several of the experiments. This, of course, was to get rid of the fallacy of mechanical transference.

In the salivary glands of the fly found infected with trypanosomes, interesting, presumably developmental, forms were found differing in form, nuclei, and granulation from the adult organisms present in the mid-gut.—(P. E. G.)

FEHLEISEN, F., M. D., and COOPER, C. M., M. D., San Francisco. **Paragonomiasis or parasitic hemoptysis. Report of an imported case in California.** *JOUR. AM. MED. ASSN.*, vol. 54, no. 9, pp. 697-699, February 26, 1910.

This paper is of special interest in that it reports the second case of human infection with the "lung fluke" in America, and again brings to the front the question of the possibility of the permanent introduction of this trematode as a parasite of man in the western hemisphere.

The first case reported in America was a Chinese immigrant at Portland, Oreg. The present case is a Japanese, 35 years old, who left Japan six years ago. He gave a history of hemoptysis dating from his twelfth year, and his malady had been correctly diagnosed by a Japanese country doctor before he came to this country.

The history of the case and the clinical findings agree with those usually described for pulmonary paragonomiasis, its course extending over a number of years and being marked by intermittent exacerbations of the hemoptysis. The disease seems to have been influenced to a considerable degree by the extent of the patient's indulgence in alcohol, the symptoms disappearing when he abstained from drink. Microscopically, two to three ova were found to a field in preparations from the thicker, rusty-colored portion of the sputum.—(P. E. G.)

DONOVAN, C., M. D., B. Ch. R. U. I., Major, Indian Medical Service. **Kala-azar in Madras, especially with regard to its connexion with the dog and with the bug (*Conorrhinus*)**. *Lancet*, London, November 20, 1909, pp. 1495-1496.

Referring to the relation established between infantile kala-azar and infected dogs by Nicolle in Tunis and his reported success in infecting dogs with *Leishmania infantum*, the author recounts two unsuccessful attempts to inoculate dogs with *L. donovani* in Madras. *Conorrhinus rubrofasciatus*, a reduviid bug is suspected of having some relation with the causation of kala-azar. It is said to feed upon the common bedbug, and the author presents evidence that at times at least it sucks human blood. So far he has not succeeded in infecting the bugs with the parasite.

A bug of this genus has been reported by Chagas in Brazil to transmit *Trypanosoma* to human beings.—(P. E. G.)

GARRISON, P. E., LEYNES, R., and LLAMAS, R. **Medical survey of the town of Taytay**. *Philippine Journal of Science*, p. 257.

The medical survey of the town of Taytay was undertaken to make a complete study of a native town under normal conditions. The town of Taytay, containing a population of about 6,000, was selected. Garrison, Leynes, and Llamas undertook the study of intestinal parasites, and compiled as a result of their work the following table:

Examinations and infections.	Number.	Percent.
Persons examined	1,000	
Persons infected	95.9	95.9
Persons infected with—		
<i>Ascaris</i>	820	82.9
<i>Trichurias</i>	770	77.0
<i>Hookworms</i>	116	11.6
<i>Strongyloides</i>	7	.7
<i>Oxyuris</i>	4	.4
<i>Amoeba</i>	27	2.7
<i>Ciliates</i>	2	.2
<i>Flagellates</i>	55	5.5
Encysted protozoa	11	1.1
Total infections	1,821	182.1
Intestinal worms alone	1,726	172.6

The roundworm infection was most frequently encountered, and was most frequently observed in female children between the ages of 2 and 14 years. The hookworm infections of 11.6 per cent occasioned considerable surprise, as the Philippine Scouts showed an infection of 60 per cent, and 50 per cent among the prisoners of Bilibid. No severe cases were encountered. The number of amœbæ also ran very low. Intestinal amœbæ are variously reported in the Philippines in from 20 to 70 per cent, but by these investigators they were found in only 2.7 per cent of the cases. The investigators believe that the figures obtained at Taytay are a better index to the frequency of infection among the general population than those which resulted from examination of soldiers or prisoners at Bilibid.—SURG. R. C. HOLCOMB.

TROPICAL MEDICINE.

Surg. C. S. BUTLER, U. S. Navy.

ANDERSON, J. F., and GOLDBERGER, J. **Typhus fever.** Public Health Reports, December 10, December 24, 1909, and February 18, 1910.

These observers give the results of their experimental work on tabardillo or Mexican typhus fever. In the first-mentioned number they give what seems conclusive evidence that tabardillo is a different disease from spotted fever of the Rocky Mountains. One of these observers, having seen both European typhus and Rocky Mountain spotted fever, was struck by their similarity of clinical picture. Ricketts had shown that the guinea pig is susceptible to Rocky Mountain spotted fever; Anderson and Goldberger were unable to produce any symptoms from inoculating typhus-fever blood into guinea pigs.

In the second bulletin mentioned, December 24, 1909, in "A note on the etiology of tabardillo, the typhus fever of Mexico," the authors report negative results of cultures made from the blood in nine cases of this disease. They also report the results of inoculation of defibrinated blood from typhus-fever patients into two monkeys, a *rhesus* and a *capuchinus*. The results were positive in both cases.

The following summary and conclusions give the result of the work described in the third paper, that of February 19, 1910, on "The infectivity of tabardillo or Mexican typhus for monkeys and studies on its mode of transmission: "

(1) At least two species of monkeys, *Macacus rhesus* and *Cebus capuchinus*, are susceptible to direct inoculation with the blood from human cases of tabardillo.

(2) One attack of the disease in the monkey produced by blood inoculation from man induces a definite immunity to a subsequent inoculation with virulent blood. The reaction following blood inoculation in monkeys "Bedalia" and "Jerry," reported in our second note, was therefore the first recorded experimental production of tabardillo in monkeys.

(3) The blood from human cases of tabardillo is infective on at least the eighth day of the disease. It seems probable, however, that it will be found infective throughout the active febrile stage of the disease.

(4) The blood from the monkey, *Macacus rhesus*, is infective by passage to a second monkey of the same species on at least the fifth and sixth days of the disease.

(5) Diluted blood serum from a human case of tabardillo, when passed through a Berkefeld filter, failed, when inoculated into a monkey, to produce the disease.

(6) The blood of a monkey of the species *Macacus rhesus* is infective, though its infectivity is somewhat attenuated, to a second monkey of the same species.

(7) The disease is not conveyed by fomites, as such, nor is it contagious in the ordinary sense of the word.

(8) The epidemiological facts of the disease, in our opinion, point unmistakably to an insect intermediary; and we believe that our observations point strongly to the body louse (*Pediculus vestimenti*) as this insect.

(9) We are of opinion that the evidence against the body louse as transmitter of tabardillo is sufficient to demand that prophylactic sanitary measures directed against this disease should take into consideration that insect.—(C. S. B.)

OUTARD, Doctor. Intoxication by fish in China. Arch. de Med. Navale, No. 7, 1909.

The author reports 70 cases of intoxication (with 1 death) characterized by an ensemble of phenomena recalling muscarin poisoning seen in intoxication by poisonous mushrooms or, better, the poisoning by poison-bearing fish.

These symptoms consist in vomiting, violent colic, with diarrhea, feebleness of heart action, coldness, and dilatation of the pupil.

The intoxication appears due to the ingestion of "*Coroïna sina*," a fish belonging to the genus *Corb*, family *Sciænes*, order *Acanthopterygiens*, which is not considered as poisonous, but which in the summer appears to undergo certain modifications which render it eminently dangerous, probably because of the advanced stage of development of the organs of generation.—(C. S. B.)

RUCKER, W. C. Note on plague infection in a wood rat (*Neotoma fuscipis annectens*, Elliot). Public Health Reports, January 7, 1910.

The discovery of a wood rat taken in Alameda County, Cal., in October, 1909, suffering with bubonic plague "adds a new link in the chain of plague." Rucker describes the habits and habitat of several members of this genus (*Neotoma*), which belongs to the New World.

As this is the first wood rat ever discovered suffering with plague it is impossible to make deductions from this single case. The wood rat may act as an intermediary in transmitting the infection to other animals.—(C. S. B.)

MÜHLENS, P., Prof. Dr., Marine-Stabsarzt. **The significance of sleeping sickness for our colonies.** *Marine Rundschau*, October, 1909, p. 1104.

Next to malaria, human trypanosomiasis, terminating in the fatal sleeping sickness, is, no doubt, the most dangerous disease threatening the white man living in the tropical regions of Africa. This disease is transmitted through the stings of *Glossina palpalis*, now recognized to be the intermediate host of the parasite *Trypanosoma gambiense*. These parasites, after passing through a special (sexual) process of development in the body of the fly, lasting from eighteen to twenty days, are then introduced through the stings of the fly, first into the blood and lymph vessels of man, where they may be discovered either in the blood itself or in the expressed juice of the swollen lymphatic glands of the neck long before serious symptoms have arisen; later they occur in the cerebro-spinal fluid.

After passing through an initial stage of excitement, the victims of the disease become apathetic, fall asleep frequently, even at meal-time, lose flesh, gradually becoming paralyzed, and then die at the end of six months or a year, generally, from some intercurrent disease.

The disease, while for a long time looked upon as being confined to the negro race, has recently been shown to attack Europeans, who also have fallen victims to it. Among negroes an annual mortality of 100,000 has recently been reported from Africa.

The principal foci are to be found along the river fronts and shores of lakes of central Africa, especially along the Senegal and Congo basin, whence the plague is reported to extend in an easterly direction, namely, in that of Uganda and the Victoria and Tanganjika lakes. Wherever the *Glossina palpalis* thrives there also this disease occurs.

The German expedition under Robert Koch reported that the disease had invaded German territory, and in August, 1907, 365 patients were already under treatment in Kisiba.

Stabsarzt Marshal reports that 20 per cent of the inhabitants on the coast of Schirati examined were found to be infected; in Kirugu and Utegi, on Mori River, 70 per cent; and on Tanganjika Lake from 60 to 90 per cent were found to be infected.

Since the return of Koch, Stabsarzt Professor Doctor Kleine has continued the work begun by Koch in Africa and has established three stations for the treatment of patients suffering from sleeping sickness, one at Bucoba (Kigarama), one at Muansa (Schirati), and one at Tanganjika Lake (Riansa). During the first quarter of 1909, 1,712 patients were under treatment at those three stations, proof sufficient of the alarming extent which the disease has attained.

Prophylactic measures are directed in two ways, (1) the extermination of *Glossina palpalis* and (2) the extermination of the parasites themselves in man.

The burning of the high-water grasses in the swamp lands has done much to deprive the flies of their favorite breeding places, and thus rendered large districts free from flies. The destruction of alligators, on whose blood the flies live, has also done much to diminish the fly pest.

For purposes of sterilizing the circulating fluids and tissues in man of the parasites, the need of a specific remedy, like quinine for malarial parasites, is, of course, greatly felt. The administration of atoxyl causes but a temporary disappearance of the trypanosomes from the blood, and, while undoubtedly diminishing the danger from infection, it can not prevent it altogether.—MEDICAL INSPECTOR H. G. BEYER.

DOERR, R. and RUSS, V. K., Private-Doents. **Weitere Untersuchungen über das pappataci-fieber.** (Further researches on pappataci fever.) From the bacteriological laboratory of the K. K. military sanitary committee, Wien. Arch. f. Schiff-und Tropen-Hygiene, 1909, Bd. 13, No. 22, p. 603.

Doerr, Franz, and Gaussig have given the name of pappataci fever to a disease occurring endemically along the coast of Herzgovina and Dalmatia, and one resembling dengue in many of its characteristic symptoms.

Doerr succeeded in demonstrating that this three-day fever, caused by a certain virus present in the circulating blood, is transmitted from man to man through the stings of a certain species of diptera, the *Phlebotomus papatassii* Scop., popularly known as "pappataci."

1. Doerr and Russ undertook to reinvestigate the properties of the serum from patients sick with pappataci fever. The experiments were all made on men, and the serum was taken from patients in the military hospital at Mostar, 0.5 c. c. being injected into healthy men subcutaneously.

In the first series of experiments the serum was obtained from the blood of a man taken twenty-four hours after the first appearance of definite symptoms of the disease. A dose of 0.5 c. c. of this serum was injected, seven hours after blood letting, into seven healthy men; these all reacted with symptoms characteristic of the disease on the fourth day after the injections.

In the second series, blood from a man, sixteen hours after the disease had declared itself, was used and injected, seven hours after it had been obtained, into four healthy men.

All these eleven persons who thus had received 0.5 c. c. of the serum, obtained from the blood of patients during the first twenty-four hours of the disease, subcutaneously, succumbed to the disease. The period of incubation amounted to four days in the majority of the cases. The susceptibility to the disease seems, therefore, to be a general one.

2. Serum was now collected from a patient forty hours after the first definite symptom of the disease had appeared, and this serum, when injected into healthy persons, remained without effect. Moreover, every specimen of serum from patients in the third, fifth, and twelfth days of the disease remained entirely without effect.

These experiments proved that the virus of pappataci fever is quickly eliminated from the circulating blood and a far-reaching and most interesting analogy had thus been established between this disease and yellow fever.

In both diseases a virus, passing through certain filters, had been discovered in the blood serum; both diseases are transmitted by mosquitoes. In yellow fever, hemorrhages, diarrhea, and black vomits never occur during the first three days of the disease, that is to say, as long as the living virus is found in the circulating blood. In pappataci fever, the hemorrhages from the nose and the diarrheas do not occur until after the end of the second day, that is, after the living and transmissible virus has disappeared from the blood. It would, therefore, appear probable that in both these diseases the above-mentioned symptoms are closely connected in time with the death of the germs and the consequent flooding of the system with the toxic substances of their bodies. These observations would also show that insects are unable to infect themselves from the blood of patients during the second day of the disease, and this again would point to the period during which such patients must be isolated. An isolation of forty-eight hours of such patients would, it would seem, be quite sufficient.

3. Atoxyl, in large doses, seemed to inhibit but not to entirely destroy the effects of the serum. Trypanroth, saponin, and oxgall had no effect.

4. Certain animals had shown themselves not susceptible to the disease. The injection of virulent serum remained without effect upon them. One attack of pappataci fever in man produces an enduring and, generally, life-long immunity. The question, therefore, was, what antibodies (of a lytic nature) had to do with this natural immunity. The experiments made with a view of throwing light on this point, showed clearly that the serum obtained from naturally refractory animals had no effect in vitro on the virus obtained from pappataci-fever patients, while the serum obtained from men, after an attack of the fever, possessed decided antitoxic properties.

5. Filtration experiments resulted in showing that, while the virus passed the Reichel and Berkefeld filters, it failed to pass the Pukal.

6. All fully developed and winged insects die on the approach of cold weather, and, therefore, no transmission of the virus by an imago from one season to another is possible. Such transmission becomes conceivable only through hereditary agencies. Since Mar-

choux and Simond, as well as the English commission, had succeeded in producing yellow fever from the stings of hereditarily infected *stegomyias*, the same is probably also the case with the transmission of pappataci fever from season to season.

In pappataci fever, as in yellow fever, the virulence of the germs is diminished during its passage from one generation of mosquitoes to another through hereditary transmission. In both diseases, the first cases are always light in character. The virus increases in virulence after repeated passage through the human organism.

Experiments made with the first crop of mosquitoes caught actually established the fact that the fever caused by their stings was of a very light, though unmistakably characteristic, nature. MEDICAL INSPECTOR H. G. BEYER.

HYGIENE AND SANITATION.

Medical Inspector H. G. BEYER and Surg. F. L. PLEADWELL, U. S. Navy.

LANGERMANN, Doctor. "Untersuchungen über den Vorgang der Selbstreinigung ausgeführt am Wasser des Giessner Volksbades" (On the process of self-purification of water as observed in the public baths at Giessen). *Zeitschr. f. Hyg. u. Infektionskr.* 1909, Bd. 64, Heft 3, p. 435.

The process involved in the self-purification of surface waters has frequently been the subject of investigation in the near past, and various more or less satisfactory explanations have been offered to account for this interesting phenomenon.

The present paper deals principally with the water supplied to tanks serving as public baths, and its behavior in these tanks during and after use. The author notes, in the first instance, the familiar fact that the number of bacteria found in a specimen of water varied with the culture-medium employed, in that more bacteria developed in gelatin and agar gelatin cultures than in agar cultures. In the second place, it was a matter of constant observation that the number of germs in the water did not show the expected increase *pari passu* with the increase in the amount of chemical impurity contained in the same, nor with the number of days nor the frequency with which it was used, but that the initial increase occurring during the first and second days was invariably followed by a decrease on the third and fourth days, regardless of these conditions. The first seven tables of the author would apparently illustrate the author's contention and the question very naturally arose of how best to explain or to account for this singular phenomenon. It was first shown that the decrease was not due to any possible exhaustion of nutrient substances in the water, nor did sedimentation alone account for it. Aeration of the water delayed but did not prevent the final decrease in the number of germs.

An examination of the centrifuged sediment showed, among such things as epithelia, hairs, fibers from clothing, sand crystals, bacteria, and algæ, a large number of paramecia, with a few specimens of vorticella, stylonychia, flagellates, *Firicola* and *lectinophry* (rhizopods). These protozoa continued to live in test tubes for weeks and as long as they were supplied with sufficient water and nutrient material. When examined under the microscope numerous bacteria were seen inside of their bodies. It could be shown in later observations that an increase in the number of these protozoa went hand in hand with a decrease in the number of bacteria contained in the water. This fact, indeed, could be confirmed by special experiments made later in the laboratory.

As a result of numerous observations and experiments, the author concludes that the decrease on the third and fourth days of the number of bacteria observed by him as regularly occurring in the water of the public bath tanks at Giessen is due to the bacteria-devouring protozoa likewise contained in the water; he likewise believes that such protozoa have a similar influence in the self-purification of all stagnant and flowing waters elsewhere.—(H. G. B.)

SCHIEPILEWSKY, E., Prof. Dr. "Ueber den Prozess der Selbstreinigung der natürlichen Wässer nach ihrer künstlichen Infizierung durch Bakterien." On the process of the self-purification of natural waters after artificial infection with bacteria. Arch. f. Hygiene, 1910, Bd. 72, Heft 1, p. 73.

The author's experiments are intended to take us a step further in our knowledge as regards the process of the purification of natural waters through the agency of protozoa.

Few natural waters are free from protozoa, and the rule is that all natural waters containing protozoa also possess manifest bactericidal properties. Along with the disappearance of bacteria in a water there goes, first, a large increase in the number of protozoa; and, second, a clearing of the water that was rendered turbid through bacteria which were introduced.

The author has found that after an infection of water with bacteria the water remains turbid during the first days (due to the culture introduced) and becomes clear within twenty-four to thirty-six hours thereafter. The first period, or that preceding the destruction of bacteria, is called by the author the period of incubation. It was shown by experiments that this period is materially shortened by repeated infections with bacteria. The period of incubation, at first long, later short, is accounted for by the fact that in all natural waters protozoa exist at first in the encysted form, later the vegetative forms are present in great abundance. Since the bactericidal properties of water show themselves only after an increase in protozoa

has occurred, the period of incubation must depend upon the condition of the protozoa contained in the same. The development of protozoa from encysted forms takes longer than that from vegetative forms and hence also the period of incubation is at first long and afterwards short.

The exciting causes for the increased development of protozoa in natural waters are furnished by the bacteria that are introduced. The author has apparently succeeded in showing by numerous experiments that it is not so much the presence of bacteria as it is the products of metabolism that furnish the exciting cause for the development of protozoa. Old cultures filtered produced the same effect as young cultures unfiltered.

His conclusions may be summed up as follows:

- (1) Natural waters possess bactericidal properties by which bacteria are destroyed.
- (2) There are but few natural waters that do not possess bactericidal properties.
- (3) The bactericidal properties of water depend on the presence and the development of protozoa.
- (4) The process of purification occurs suddenly; the removal of the bacteria occurs by "crisis," after a certain period has elapsed and during which the increase in protozoa takes place.
- (5) The increase of protozoa is excited by the products of the autolysis on the part of the bacteria.—(H. G. B.)

BASTIER, médecin de 1re classe de la marine. **La ventilation pendant le combat** (**Ventilation during battle**). Extract from a medical report on the *Patrie*, 1908. Archives de médecine navale No. 12, December, 1908.

What shall be the ventilation during battle? The lessons of the Russo-Japanese war give us good grounds for presenting this question, which is not solved by any existing arrangements, either on the *Patrie* or any other men-of-war. During the battle of Tsushima numerous cases of asphyxiation occurred, especially among the Russians, and it was demonstrated that the better-ventilated compartments exposed their occupants more to the influence of gases than those receiving the outer air in smaller quantity. The gases produced from modern explosives are rich in carbon monoxide and nitrous compounds, and the ship against which a large caliber shell may burst remains, in spite of its movements, enveloped by a deleterious atmosphere, from which the blowers draw in noxious air in place of refreshing air. Hence, there arises this new conception in the organization for battle, which anticipates the stopping of the blowers. Evidently this measure would be impracticable,

if it must be prolonged, but the rapidity of fire now attainable would render this situation a momentary one. It becomes therefore humanitarian and prudent to order that "When the enemy's fire becomes severe, all blowers, whose function it is to improve the habitability of the living spaces, be stopped."

An exception should be made, however, in the case of the fireroom blowers, charged by necessity with delivering air to support combustion, even at the risk of some inconvenience to the fireroom force, and it is to be hoped that this air, which is swallowed up by the fires and does not accumulate, will be less noxious than elsewhere. Even communication between compartments by ventilating ducts should be shut off, for it is necessary to avoid the extension of asphyxiation gases in the event of a shell exploding in a compartment after having penetrated the deck or ship's side. The danger of asphyxiation will then be so great, on account of the diffusion of the gases, favored all the more by the condensation and rarefaction incident to explosions, that the stoppage of blowers will be an insufficient remedy and another must be sought. The first method which comes to mind is the storage of air under pressure. I believe it will become necessary to devote space in our ships to the construction of reservoirs of compressed air in all compartments where a ventilator is recognized as necessary in times of peace. The capacity of these reservoirs will be such as to furnish before their final discharge two or three powerful ventilations of the space to be served. Charged before battle and recharged during the intervals of battles, these reservoirs, unlike the ventilators, will only deliver pure air intermittently, unless the contained air becoming foul or asphyxiating will render necessary the opening of the reservoir valves. Such apparatus will necessitate, it is true, extra weight and additional space, for a use that is only ephemeral, but I believe them necessary, as there has not yet been found the true remedy, a chemical compound which will neutralize or decompose monoxide of carbon and the nitrous compounds.—(F. L. P.)

HEISER, VICTOR G., U. S. Public Health and Marine-Hosp. Service. **Report of Bureau of Health for the Philippine Islands, third quarter, 1909—Letter of transmittal.**

The sanitary condition of the Philippine Islands, more especially that of the city of Manila, on account of its more or less intimate relations with the fleet and its consequent influence on the sanitary condition of the personnel in the fleet, must always be of great interest to naval medical officers.

Tenement and lodging houses.—An active campaign to relieve the condition of overcrowding in the city of Manila was immediately met by an active opposition, in most instances, due to the fear on the part

of landlords of a lessened income, the usual cause of a conflict between the personal and selfish interests of individuals and the interests of communities at large.

The new sewer system.—Ordinance No. 125 of the city of Manila, regulating and enforcing the use of sewers and drains in the city, was finally enacted September 27, 1909. A steady increase in the number of connections between premises and sewers is reported as taking place from month to month. The city engineer's office reported that there occurred 19 connections in August, 55 in September, or a total of 98 since the new sewerage system was ready for service—that is, since May last.

Smallpox.—There were only five cases reported during that quarter, and no deaths.

Hookworm campaign.—An examination, completed on September 30, of 6,000 people, all residents of Las Piñas, in the province of Rizal, showed that 24.2 per cent of the males and 8.06 per cent of the females were found infected with hookworm, or an average per cent of 16.13 of population, and about 90 per cent of the entire population were infected with some form of intestinal worms. In connection with these hookworm investigations, a free medical dispensary became so popular an institution that, when it was learned that the work was to be discontinued, the health office was literally "flooded" with petitions for having the dispensary service continued.

Flies.—Flies are now known to convey many infectious diseases. For the Philippine Islands, typhoid, dysentery, and Asiatic cholera are the most important considerations in this connection. The war is waged against the breeding places of flies. The results obtained with formaldehyde solution 1:500 in shallow dishes and covering street sweepings with a layer of clean earth 20 cm. thick, after treating them with lime and crude petroleum, are reported to be satisfactory. The satisfactory results obtained in combating cholera are said to be due in part to the lessened number of flies.

Cholera.—In the beginning of July cholera was present in Sexmoan, Bacolor, Porac, San Fernando, and Pampanga; later in the month Guagua, Lubao, and Santa Rita became infected. Pampanga was reported clear on August 7. The Hagonoy outbreak was suppressed in eighteen days with a total of 40 cases.

The examination of stools of sick children enabled the bureau of health of Manila to find and isolate many light and typical cases which would otherwise have escaped attention. Cholera was widespread in the Philippine Islands, but owing to the energetic measures of so capable a sanitarian as Victor Heiser, it was practically confined, at the end of the quarter, to the provinces of Ambos Camarines, Bataan, Bohol, Bulacan, Cebu, and Oriental Negros. The daily number was decreasing in all the provinces, and the daily average for Manila was three cases.—(H. G. B.)

NIEBRASCHK, Doctor, Stabsarzt. "A contribution to our knowledge of the spread of typhoid through bacillus carriers (Dauerausscheider)." *Zeitschr. f. Hygiene u. Infektionskr.*, Bd. 64, Heft 3, p. 454. Leipzig, 1909.

For a series of years a number of typhoid-fever cases had occurred in the artillery garrison of Wesel, Germany, for the causation of which even the most careful search had invariably proved fruitless. The most thorough and in every respect complete overhauling of the water supply of the garrison invariably resulting in the exclusion of this as a possible cause of the conveyance and spread of the disease, attention was directed to the presence of bacillus carriers as a possible cause.

After long and diligent search a sergeant was indeed discovered who, while himself in the most perfect health, voided a urine, though perfectly normal in every other respect, containing 2,500,000 virulent typhoid bacilli per cubic centimeter of urine. His isolation promptly arrested the small epidemic and no more cases of typhoid were noted during the now two years following this isolation.

In his very careful and detailed description of the possible spread of the endemic through the urine of this man, given by the author, it is a little surprising that no mention whatever is made of any possible share which flies might have had in it; flies certainly infest urinals to a very great extent.

Of considerable practical importance, however, are the therapeutic results obtained by the author. Sergeant B. was at first treated with the usual remedy, namely, urotropin. This remedy, while causing a gradual disappearance of the bacilli from the urine, did not prevent their reappearance. Hetralin, a preparation consisting of 56 per cent of urotropin and 44 per cent of resorcin, was next tried, but this also failed to prevent the reappearance of the bacilli in the urine. Finally, borovertin, a preparation composed of urotropin and boric acid, was tried (triborate of hexamethylentetramin) and, while the administration of this drug, in the large doses in which it had to be given, 1.5 grams four times daily, made the patient very sick, it finally resulted in the complete cure of the man and the permanent disappearance of the bacilli from the urine. The sergeant was consequently restored to his full duty and has remained well since that time, now over two years.—(H. G. B.)

KNOFF, S. A., M. D. "What may be done to improve the hygiene of the city dweller." *Med. Record*, January 8, 1910, p. 49.

With regard to the often and much discussed smoke nuisance, our author is of the opinion that the problem can be solved by the installation of a device known as the Bunsen smokeless furnace, which applies to steam boilers the principle of the old Bunsen burner for

kerosene lamps. The company agrees to install the Bunsen entirely at its own expense, to protect their customers against fines for violation of the smoke ordinances of any city, and accept as remuneration an amount equal to the fuel saved their customers during a period of one year by reason of installation of the device.

Just as necessary as it is to prevent the pollution of streams by forbidding factory refuse or sewage to be poured into them, so it is to prevent dangerous gases coming from factories and odoriferous automobiles from polluting our atmosphere.

The useless ear-piercing noises made by some automobilists are a bane to the city dweller's nervous system: "The less you use your Gabriel siren, or other ear-splitting device, the better for the comfort of those within and without the car. Use your hand horn with a gentleman's touch and reserve the atmosphere piercers for emergencies. They are valuable at times, but many people, especially sick ones, prefer other music."

In 1899 Knopf recommended the following precaution in the handling of bread by too many soiled hands: The moment the bread comes out of the oven, while it is still too hot to be handled, it should be placed with the aid of a shovel upon a piece of clean wrapping paper, large enough to envelop the whole loaf. By twisting the two ends of the wrapper the bread is completely inclosed and protected from contact with unclean hands or garments until it reaches the consumer. City dwellers obliged to dine in restaurants are often served bread cut partially into slices. Anyone desiring some bread takes the whole loaf in his hand and tears off a portion. It thus often happens that the same bread is often handled by a number of individuals with more or less unclean hands. Contact infections are thus rendered possible.

The very readable article contains a number of useful hints in regard to both municipal and home hygiene.—(H. G. B.)

LEWIN, ALPHONSO, D. D. S. "Oral prophylaxis." *Journal A. M. A.*, February 12, 1910, Vol. LIV, No. 7, p. 508.

The aims of oral prophylaxis are to procure and to preserve an oral cavity not only clean but resistant to disease germs. It is estimated that not one-third of our 20,000,000 school children take any care of their mouths, and yet the mouth is one of the most important gateways through which the germs of many infectious diseases enter. The problem is to be attacked through the establishment of free dental school clinics. Sundry efforts to introduce such clinics have been made in various cities of this country with varying success. Even Mexico is said to have established free dental school clinics.

School dentistry has been considered of such vast importance in other countries that it has already been adopted by thirty-three of the principal cities of Germany, and fifteen cities of other countries.

Thus, Mühlhausen, Darmstadt, and Strassburg are said to possess model dental school clinics. Thus also in five years' work in Strassburg and its suburbs, 90,017 children altogether from the elementary and intermediate schools, received free treatment and the municipal government of that city has authorized the erection of a building for the dental treatment of school children, at a cost of \$60,000.

The necessity for a systematic oral prophylaxis in the navy generally and on board ship more especially, is exceedingly great and urgent. A corps of dentists, trained in the problems of general prophylaxis and in the principles of special prophylaxis of the mouth, are indeed urgently needed.—(H. G. B.)

BARTHÉLEMY, Médecin principal de la marine, Fièvre typhoïde et eau distillée, à bord du "Bouvet." Arch. de Méd. Nav., vol. 92, No. 11, November, 1909, p. 336.

Barthélemy tells of a small epidemic of typhoid fever being arrested by a strict attention to the water supply. He found, while the system of water distribution on board the *Bouvet* was good, the system in use for the collection and the storing of the distilled water left much to be desired. However, even after a most thorough disinfection of all the water tanks and the substitution of a metallic for a rubber pipe for filling the tanks had been made, cases of typhoid fever continued to occur. A careful watch was now organized in the hold where the water tanks were located until one day the surgeon of the ship discovered one of the men in the hold (bacilli-carrier?) reaching into one of the distilled-water tanks with a very dirty pitcher, the man himself being covered with filth at the time. The leak in the system was henceforth supposed to be discovered and after the necessary precautions had been taken to prevent such outside accidental contamination, no more cases of typhoid fever occurred.—(H. G. B.)

V. NATZMER. A general German fencing tournament held on the 3d and 4th December at Dresden.

Fencing, as a sport for the officers in the navy, has been revived in Germany only about a twelvemonth since. The number of participants from the navy at the tournament at Dresden was proportionately much larger than that from the army, and the performances on the part of naval officers very encouraging. v. Natzmer says that the ability to fence should be made a requirement for every officer

allowed to carry a sword; it is splendidly adapted to ship life; its practice steels the body, trains the eye to quickened perception, and helps to form quick conclusions—in other words, it develops faculties needed in a leader of men.—(H. G. B.)

Report of the International Opium Commission, Shanghai, China. Vol. I. Report of proceedings, pp. 117. Vol. II. Reports of the delegations, pp. 372 and tables. Published in England by P. S. King & Son.

The recommendations of fundamental importance made by the commission are the prohibition of poppy cultivation, the closing of the divans, the gradual suppression of the practice of opium smoking by the issue of licenses to consumers as well as traders, the prevention of opium smuggling, and the gradual education of the people in the Empire, drawing attention to the pernicious effects of the drug.—(H. G. B.)

SURGERY.

Surg. RAYMOND SPEAR and Passed Asst. Surg. H. W. SMITH, U. S. Navy.

GIBBON, JOHN H. Resection of the colon for cancer and tuberculosis. Annals of Surgery, September, 1909.

This well-known professor of surgery of the Jefferson Medical College reports a series of 10 cases on which he has operated during the past six years.

The important points of each case are clearly set forward, the operative procedures are commented upon, looking backward, so to speak, thereby making his deductions and advice of special value.

Gibbon quotes Moynihan (Abdominal Surgery): "There are few rules so binding upon a surgeon as that that prohibits the resections of growths and subsequent end-to-end anastomoses of the large intestine in cases of acute obstruction." He goes on to state that the temptation is sometimes strong to break this rule, but if this is done disaster is courted.

Attention is called to the fact that the lower down in the intestinal tract the obstruction is situated the greater the absorption, not due to greater absorbing area, but to the greater number of pathogenic organisms.

The toxicity of the intestinal contents in acute obstruction is touched upon and reference is made to the experimental studies of Clairemont and Ranzi, whose conclusions are as follows:

The intestinal contents above the stenoses after being rendered free from bacteria by filtration always proved poisonous whether administered intravenously or hypodermatically. Bouillon cultures of small quantities of the

contents after four or five days gave toxins equally poisonous. Thus the poison is the result of bacterial growth. It can also withstand heat. The toxic action can be paralyzed by mixing the material with the brains of normal rabbits or guinea pigs. The filtered intestinal contents in some instances showed intense hæmolytic power when administered to dogs or horses. It was impossible to establish either active or passive immunity to the poisons which seemed to show that an extension of serumtherapy to the treatment of ileus is impossible.

Reference is made to Monk's work showing the importance of emptying the bowel above the obstruction by puckering the intestine on a large blunt tube passed into its interior.

W. J. Mayo is also quoted as saying that a fair proportion of the mortality following resection for obstruction is due to perforation from thrombosis, and he therefore urges great care in handling the distended bowel on this account. He advises tracing the collapsed bowel up to the obstruction rather than the distended bowel down to the obstruction.

The best procedure, the author concludes, is the one advised by Paul. It consists in loosening the bowel from its attachment, bringing the growth out through the wound, dividing the bowel well above and below the growth, and inserting into the proximal and distal ends two glass tubes connected with a rubber drainage tube, and then the removal of the growth. Later an anastomosis is accomplished by a crushing forceps and the fecal fistula closed. Von Mikulicz, Hartmann, and Mayo advise practically the same operation.

The relative merits of end-to-end and lateral anastomoses depend largely on the portion of the bowel involved. Attention is invited to the fact that in the ascending and descending colon and the colon at the hepatic and splenic flexures a large portion of the posterior portion of the gut has no peritoneal coat, and as the mesentery is wide a complete peritoneal approximation is impossible.

In resections of the cæcum it is advised to perform a lateral anastomosis with the transverse colon under the omentum by the lateral method.

Lateral anastomoses are preferred to any other method, as they can be quickly performed, there is no tension on the suture line, the bowel at each end can be anchored by a few interrupted sutures, and there is no danger of a stricture, as so often happens in an end-to-end anastomosis.

The method of suture without mechanical devices is recommended and the use of the Murphy button in the colon is strongly condemned.

On the whole, a small drain is advisable in large intestinal anastomoses. The drain should not rest directly on the suture, as it invites a leak.

Deaths result most frequently from necrosis of the bowel and leakage. The best operative results have been obtained when primary drainage of the bowel has been employed.

Gibbon believes that the ultimate mortality is not due to a too limited resection, as it is well known that glandular involvement takes place late as compared with malignant disease elsewhere. In cancer of the cæcum the whole ascending colon should be removed, as it is better to perform the anastomosis between the ileum and transverse colon. In carcinomas involving the hepatic flexure the ascending colon and the cæcum should be removed, for an ileocolostomy is easier of performance and better than an anastomosis between the ascending and transverse colon.

An important fact, first pointed out by Mayo, is that in four cases out of five the transverse colon is supplied with blood solely by the middle colic, so any disturbance with that artery will result in a necrosis of the whole of the transverse colon.

The pitfalls of surgery of the large bowel are clearly disclosed by the author. Indications as they exist, both anatomical and pathological, are clearly dealt with by advising simple mechanical procedures based on sound surgical judgment.—(R. S.)

GERGÖ, EMERICH, Budapest. Serum treatment of purulent processes. Surgery, gynecology, and obstetrics, January, 1910.

The author reports on 160 cases of suppuration including abscess of the soft parts, infiltrating suppurations, bone suppurations, bone fistulæ, and fistulæ of soft parts.

The manner of procedure is simple; the skin surface at the site of puncture was disinfected by the application of tincture of iodine. Instead of opening the abscess by an incision, a puncture was made, the pus aspirated with a syringe, and the cavity repeatedly irrigated and aspirated until the serum returned clear. A quantity of serum, from one-third to one-half of the amount of pus removed, was allowed to remain; the puncture was then sealed with gauze and adhesive plaster.

After this procedure the abscesses, except large and deep-seated suppurations, usually proceeded to a rapid cure, the smaller the quantity of pus the more rapid the cure. Cases containing from 1 to 5 c. c. of pus averaged three days, and so on to those cases containing 20 to 25 c. c., which required eleven days to effect a cure. Cases containing 50 c. c. to 1½ liters took a much longer time to heal, from eight days to five weeks.

There were very few unfavorable complications. These were fistulæ, which occurred in one-fourth the cases and healed spontaneously, usually within a week. In one case of a spreading abscess in a decrepit patient the abscess continued to spread. Pigmentation of the skin over the abscess occurred twice, and a large local scar formation was noted in one other case.

The method is useless in infiltrating suppurations such as felons and carbuncles, also in bone suppurations.

In cases of fistulæ of the soft parts the results were good in seven cases.

In a word the antiferment serum is effective where it can be brought in contact on all sides of the suppurating surface.

Antiferment treatment is indicated in acute abscesses of soft parts, except where the abscess is large, over 50 c. c. of pus, in deep-seated abscesses, in abscesses occurring in decrepit or old people, and in tuberculous abscess. The advantages of this form of treatment are that it obviates painful dressings, leaves little or no scar, and enables the patient to continue his work undisturbed.

Other procedures to substitute other remedies for the antiferment procedure have been tried. Physiological salt solution in large quantities increased the inflammatory phenomena. A small quantity of calcium chloride, 0.001 to 0.01 per cent, stimulated phagocytosis. It may also remove the toxic effect of the sodium chloride on the cells (Loab). Injections of animal serum (horse serum and cow serum) are accompanied by severe reactions with a hyperleukocytosis.

Gergö refers to one hundred cases of purulent infections in which he experimented with the dose of animal serum to find the proper dosage. Small doses, 1 to 5 c. c., of the serum produced marked inflammatory reaction.

The author points out that until we fully understand the complicated mechanism of physiological defense in all its phases we will not be qualified to treat all infections effectually.

To Dr. Edward Müller is given credit for introducing this new procedure of treating cases of suppuration.

MacEwan, in the *British Medical Journal* of January 22, 1910, discusses the same subject and goes into detail as to what preparations of sera and antiferments have been used.

Good results have been obtained from the use of transudation fluids containing the antiferment in natural solution from the thorax and abdomen; hydrocele fluids have also been used. MacEwan states that in spite of filtration through porcelain filters there are real and sentimental objections to using sera from the patients, but is not specific in his statement. The serum derived from the lower animals is usually deficient in antiferment content, but this can be increased by immunizing the animals with the ferment of human pus.

MacEwan reports fifteen cases of acute abscess treated by injections of leucofermantin, which was supplied by Merck, of Darmstadt. Merck uses pancreastrypsin in the preparation of his animal serum. For investigations have shown that the leucocytic antiferment and antipancraestrysin are evidently identical and that the preparation of the animal pancreastrypsin like leucocytic ferment has the effect of

increasing the antiferment to the extent of making it equal to that of the normal human serum.

MacEwan refers to the work of Müller and agrees with Gergö that the method is based on a sound principle, and a new pathway of physiological treatment is opened up in the treatment of acute localized suppurations, where the pus can be evacuated and the serum containing the antiferment can be brought directly in contact with the pus-producing surface.—(R. S.)

FRIEDRICH, P. L., Marburg, Germany. *Thoracic surgery*. Journal A. M. A., December 11, 1909.

The author outlines the work being done in his clinic in lung surgery made possible by operating under positive and negative pressure, and classifies his cases under four headings:

I. Intrapulmonary interference with diseased foci.

II. Influencing pulmonary affections by way of pleura through compression of lung.

III. Operative procedures on the thoracic wall for the mechanical influencing of the pulmonary function, thereby reacting on pathological processes in the lung.

IV. Operative treatment of the diseases of the thoracic wall itself, in as far as this leads to exposure of the lung.

Simple intercostal incision is employed for penetrating into the lung. A special operating table supports the head and back of the sound side in such a manner as to render the side to be operated upon free of access in front and behind. A strong rib spreader makes the lung accessible and does away with the necessity oftentimes of rib resecting.

Complete information of the existing lung condition can be obtained by use of the differential pressure method. This therefore often replaces the older method of a lung incision. The lung can be readily palpated and by changing the circulation through variations of pressure diseased lung can be differentiated from healthy lung. These pressure-difference chamber operations can be safely performed within fluctuations of 3 to 8 mm. of mercury.

Infection is the serious danger in lung surgery. We add to the danger of the operation when we operate in the presence of a pneumothorax or close wounds before a pneumothorax has been entirely removed.

Resection of ribs is only used in operations for abscesses or gangrene. Here it is advisable to suture the diseased segment of the lung to the thoracic wall, opening the lung at the time of operation or subsequently after adhesions have formed.

In lung injuries the author aims to close the wound by direct suture, perhaps after trimming the edges, either with inverted or penetrating sutures of silk. Small wounds of the lung are readily found by the differential-pressure method.

In removal of tumors of the lung, segments of lung tissue may be amputated and the bleeding points ligated. The bronchi devoid of cartilage may be ligated after the mucosa has been separated. If the bronchi contain cartilage, it is better to treat them by the partial open treatment in the wound, fixing the lung to the chest wall and reducing the size of the wound by sutures.

In prolonged operative procedures the lung tissue must be kept covered with tampons and compresses.

The value of X-ray examination in the diagnosis of tumors, abscesses, etc., is indispensable, for by its aid a diagnosis can be made in the absence of physical signs.

Compression of the lung through the pleura by the introduction of nitrogen is looked upon with much favor in certain cases where it is advisable to make the lung shrink and put it at rest.

Thiersch drainage of empyemas by the insertion of a large trocar into the abscess cavity is recommended in these cases. After the trocar has been inserted a large fenestrated Nelaton catheter is passed through the sheath of the trocar, a rubber membrane with a small opening is then passed over the catheter, tied fast to the tube where it emerges, making an air-tight closure of the thoracic cavity. The catheter is then continued in a soft walled tube, which acts after the fashion of a vein.

Operations on the thoracic wall for disease of the lungs have been performed many times by the author with success. He generally leaves the first rib in his operations for deossification of the chest wall, as its removal prolongs the operation. Cases for these operations must be carefully selected; they must be free from active tuberculous processes in other parts of the body, especially the bowels.

In pulmonary emphysema the author goes further than Freund and removes pieces of cartilage from several ribs to the extent of 4.5 to 6 cm. in length. The retrocostal periosteum should be thoroughly removed to insure permanent mobility of the chest wall.

The differential-pressure method of operating, in the opinion of Friedrich, will soon score a triumph in operations on the diaphragm for the removal of tumors, also for operations for repair of wounds of the heart. The hæmorrhage from a heart wound diminishes in proportion as the lungs are allowed to collapse. The pneumothorax becomes the regulator of hemorrhages and is allowed to persist until suture of the heart has been completed. It can then be removed.

The exposure of the root of the large vessels and entrance into the anterior and posterior mediastinum are facilitated by a transverse

sternothoracotomy between the second and third ribs. A bilateral ligation of the internal mammary is accomplished, and the sternum sawed through from behind by means of a Gigli saw. These procedures open the way to operative procedures for stenoses at the aortic and mitral valves.—(R. S.)

MOSCHCOWITZ, A. V. **The technique of amputations, with especial reference to osteoplastic methods.** Medical Record, December 18, 1909.

Moschowitz states that he has been using the osteoplastic method of amputation since the method was evolved by Bier in 1897 with great satisfaction and with much better results than he had experienced in his previous work by other methods.

The causes of success or failure are grouped under five heads: (1) Skin and cicatrix; (2) muscles, fasciæ, tendons, etc.; (3) blood vessels; (4) nerves; (5) bone and periosteum.

(1) Skin and cicatrix. Heretofore it was considered desirable not to have a cicatrix lie over the end of the stump. A large number of stumps have been examined by the author to determine this point, and he is of the opinion that the tenderness of a stump has no relation to the site of the cicatrix; and, furthermore, the cicatrix was found in many instances to be anæsthetic. Another point determined was that it is not necessary to cover the stump with skin that is normally subject to pressure, such as is done in Gritti and Pirogoff amputations, the only considerations being the viability and absence of infection in the skin.

(2) Muscles, fasciæ, and tendons. Formerly it was taught that a stump should be well padded with these structures. Moschcowitz points out the fact that all of these tissues atrophy and disappear, so they are of no importance in a stump.

(3) Blood vessels are not considered as factors in the production of pain.

(4) Nerves. A nerve may cause a painful stump, such cases being due to improper technique. Tender stumps due to nerve involvement are, however, rare.

(5) Bone and periosteum. The author believes these structures are responsible for good or bad stumps. He enumerates the different methods that have been used: (1) Cutting the periosteum and bone off at the same level; (2) covering the end of the bone with a cuff of periosteum; (3) the aperiostial method, in which the periosteum was removed at a higher level than the bone. All these methods have been unsatisfactory. (4) The osteoplastic method, when it can be applied, has given uniformly good and painless stumps. The fact is brought out that the bones of the feet are covered with periosteum

and do not become tender on use. This is apparently a very simple fact, but likewise a very logical and important one.

The best stump is one that is painless and can bear weight on the end and serve as a lever for an artificial limb.

Moschcowitz states that the point of election of an amputation is the lowest possible point; the quality of the skin and cicatrix should be disregarded.

Attention is called to a method of determining the proper point to amputate in cases of Reynaud's disease. A Martin bandage is applied to the limb sufficiently tight to cause an anæmia; it is then removed. The lowest border of the area of primary reactive hyperemia is the proper point to amputate.—(R. S.)

COOPER CHARLES M. The routine examination of the œsophagus. Amer. Jour. Med. Sciences, February, 1910, p. 221.

Cooper furnishes a useful review of the diagnostic examination of the œsophagus, which is timely, since full knowledge of recent advances in operative technique made possible by pressure chambers and in diagnostic methods is not as yet generally diffused. He arranges the procedures in the form of a usable routine.

SYMPTOMATOLOGY (ABBREVIATED).

(1) Difficulty in swallowing is the overwhelmingly important symptom indicative of a lesion of, or interference with, the œsophagus.

(2) Of every 100 patients who come complaining with this symptom, from 60 to 90 suffer from malignant disease. Of persons so afflicted, over 70 per cent are males. It is possible that syphilis plays an important rôle in the etiology. Ten per cent of carcinomas are located in the cervical region, 40 per cent at the bifurcation of the trachea, 30 per cent at the lower end, while 20 per cent are secondary to cancer of the stomach.

(3) In interference with deglutition from causes outside the œsophagus, difficulty of swallowing is rarely the first or only complaint, * * *.

(4) The œsophagus is relatively insensitive, and severe pain commonly implies a spread of the disease beyond the œsophageal wall. Head's painful skin areas, discovered on the passage of the bougie, are (a) at a spot 2 inches from the middle line posteriorly at the level of the angle of the scapula, and (b) at a spot in the fifth interspace anteriorly about half an inch internal to the nipple line.

(5) The œsophagus has no nerve terminals which indicate location and the patient's idea as to the seat of the disease are absolutely untrustworthy.

(6) Auscultation * * * gives meager information.

(7) Grave organic disease of the œsophagus frequently leads to disturbed innervation of the tube.

(8) The amount of dilatation which takes place above the carcinomatous stricture is relatively small, and the regurgitation of a large quantity (above 3 ounces) of food from the œsophagus should suggest a cause other than carcinoma. * * * Since free HCl is not often to be found in the stomach con-

tents of a patient afflicted with œsophageal carcinoma, its absence from the regurgitated food does not prove the latter to come from the œsophagus.

(9) Emaciation to an extreme degree may ensue when swallowing is seriously impaired, though the lesion may be nonmalignant.

(10) Unilateral paralysis of the vocal cord is quite a common occurrence * * * and * * * may be present in the absence of any change of voice.

(11) * * * The loss of the swallowing reflex is indicative of lesion of either or both recurrent laryngeal nerves (a full and correct history is important).

Then should follow a clinical examination and, later, laryngoscopic and hypopharyngoscopic examination. Next, the patient is given water and afterwards bread. The voluntary contraction of the mylohyoid muscles are the accompanying elevation of the larynx and are watched for, and also the ensuing involuntary part of deglutition. After the patient has swallowed as much food as he can it is noted:

(1) If there be any change in the shape of the neck; if by shaking the patient's throat we can produce a succussion murmur. Or if recently administered bismuth capsules may be massaged back in the pharynx.

(2) If the laryngeal picture has changed.

(3) If there be any change in the character of the radial pulse from that exhibited prior to his eating.

Then the X-ray examination is in order. The author believes—

That fluoroscopy is a procedure dangerous to the operator and necessitates too much time * * *; that many clinicians are not prepared to accept reports not based on shadows which can be registered on a plate * * *.

The procedure is as follows:

(1) If we suspect a supra-aortic pouch (diverticulum) 2 or 3 teaspoonfuls of a mixture made up of equal parts of bismuth subcarbonate * * * and sugar of milk, with enough water to make a paste are administered. We then make a radiogram as of the lung apices.

(2) If we suspect that the pouch lies below the level of the aortic arch, the patient is radiographed in the left anterior oblique position.

(3) If we suspect the presence of spasmodic contraction of the cardia (cardiospasm) with an accompanying œsophageal dilatation, we ask the patient to drink as much as he can of a pint of koumiss with which an ounce of bismuth subcarbonate has been mixed. The patient is then at once radiographed in the right anterior oblique position.

(4) If we suspect the presence of carcinoma of the œsophagus we ask the patient to swallow a few teaspoonfuls of the bismuth paste and then one or two capsules each containing 0.5 gram of bismuth. The patient is then radiographed in the right anterior oblique position. The capsules are arrested at the upper limit of the growth. The dilatation above the cancer may appear like that of a diverticulum, but the stenosed lumen of a malignant growth gives a funnel-shape to the shadow.

(5) If we suspect a narrow stricture, and suspect a diverticulum above, we can administer one capsule. This will obstruct the lumen. If the patient then swallows as much bismuth suspension as he can, a radiograph will show the extent of the dilatation.

(6) If the history of a previous examination has rather suggested an extra-œsophageal cause for the difficulty of swallowing, we make two radiographs

after the patient has swallowed the capsule and paste, one in the antero-posterior direction during suspended respiration, the plate to include the region of the neck; the other radiograph is made in the right anterior oblique position. One or both of these plates will show the seat of delay and give valuable information regarding the nature of the underlying lesion.

(1) If we conclude that an aneurism is present, no further investigation is required or indeed justifiable.

(2) * * *.

(3) If we are convinced that a carcinoma of the œsophagus is present, the less instrumental meddling the better for the patient.

If further investigation be advisable, examination with the sound and œsophagoscope is now in order. The passing of the sound should precede.—(H. W. S.)

DENCH, E. B. *The treatment of acute otitic meningitis.* Am. Jour. Med. Sciences, February, 1910, p. 157.

The paper by Dench may be briefly summarized:

(1) First should be placed the prophylactic methods. Every acute middle-ear inflammation should be treated along modern surgical lines, by early and free incision of the drum membrane, thus affording a prompt evacuation of the products of inflammation in the tympanic cavity, and lessening the possibility of extension of the inflammatory process inward to the cranial cavity.

(2) When the inflammation has extended to the cranial cavity, the first indication is to thoroughly eradicate the primary focus of infection by performing either the complete mastoid or the complete radical operation, according as the disease is dependent on an acute or chronic middle-ear suppuration.

(3) It has been shown that the most common site of extension of an inflammatory process from the middle ear to the meninges is through the labyrinth; consequently, fistulous openings, should be sought in the outer wall of the labyrinth, and, if found, enlarged and the labyrinth drained by opening the semicircular canal, vestibule, and cochlea.

(4) If the meningeal symptoms are pronounced, and indicative of increased intracranial pressure, lumbar puncture should be performed at the same time that the middle-ear cavity is exentrated. The puncture serves not only as a diagnostic measure but as a means of relieving temporarily, at least, the intracranial pressure. The operation may be repeated whenever there is evidence of increased intracranial pressure, as indicated by a low pulse rate, beginning choked disk, stiffness of the neck, and other similar symptoms.

(5) More radical measures may be demanded at the time of the first operation. Lumbar puncture may not suffice and reduce pres-

sure or the foramina may be blocked. In cases, therefore, in which the meningeal symptoms are extremely urgent it is wise at the time of the primary operation to relieve the intracranial pressure by means of a decompression operation. Incision of the dura should be included. The site of the decompression may be over the temporo-sphenoidal lobe, over the cerebellum, or in both regions. If the symptoms are extremely urgent the lateral ventricle may be opened at the time of the decompression operation. Preferably, however, the opening of the ventricles should be delayed for from twelve to twenty-four hours, in the hope that the incision may relieve the tension temporarily, and that the effused fluid may be absorbed.

(6) In cases in which the infection seems to have traveled through the labyrinth to the subdural space, draining all the subdural space on the posterior surface of the petrous pyramid, in the region of the aqueductus vestibuli and the aqueductus cochleæ, should be instituted.

(7) The results in the treatment of the purulent meningitis by serum are too uncertain to allow any definite opinion as to its value to be given at present.—(H. W. S.)

DAVIS, J. S. **A method of splinting skin grafts.** Johns Hopkins Hospital Bulletin, February, 1910.

The author uses a coarse-meshed net, such as is used for curtains, made of loosely woven cotton thread, surrounding openings about 1 cm. in diameter; smaller openings clog. This net material is soaked in a solution made of pure gutta-percha from 15 to 30 parts (depending on the stiffness required) and chloroform 150 parts. After the chloroform evaporates the material is stiff enough to act as a splint for skin grafts.

Sterilization is easily performed by placing in a solution of 1-1,000 of bichloride of mercury, the solution being changed three times at twelve-hour intervals. The mesh is kept permanently in a solution of the same strength. No heat can be used during sterilization.

The mesh is rinsed off with salt solution and dried in a sterile towel. It is then applied over the graft and so cut as to overlap the skin surrounding the area to be grafted. The mesh can then be secured to the parts by means of adhesive plaster.

It is advisable to perform the first dressing thirty-six to seventy-two hours after the grafts have been applied. Care must be taken to thoroughly soak the overlying gauze before it is removed. The mesh is usually left in place from four to ten days.

Any type of dressing can be used over the mesh—silver foil, wet, or dry gauze—or it may be used without any further dressing.

The advantages claimed for this mesh over strips of rubber, etc., are its simplicity of application; it allows the free escape of secretions and so prevents maceration. The grafts can be kept constantly in view, and if blisters form the serum can be removed.—(R. S.)

Vaccine treatment of pyorrhea alveolaris. Goadby, *Lancet*, December 25, 1909, and Medalla, *Boston Med. and Surg. Jour.*, January 13, 1910.

Goadby reports in detail fifty-one cases of pyorrhea treated by autogenous vaccines with remarkably good results. For descriptive purposes he divides alveolar suppuration into two types, (1) those which show constitutional disturbances due to intoxication or to bacterial invasion, and (2) those which have only local manifestations. Many of Goadby's cases exhibited severe general toxemia, chronic intestinal catarrh, anemia and rheumatoid disturbances due to slow toxic absorption or definite bacteremia.

In preparation of the vaccines an agar plate is made of the pus from the tooth socket and the various organisms cultivated separately; the opsonic index of the patient with regard to each of the bacteria isolated is determined and those to which it is distinctly high or low are used for the vaccine. The organisms most commonly found are the micrococcus catarrhalis, pneumococcus, the diphtheroid group, and staphylococci. Micrococcus catarrhalis with pneumococcus or staphylococcus aureus is present in the majority of cases.

Medalla reports a series of thirty-two cases with cure or marked improvement in every case. He uses autogenous vaccines prepared in a manner similar to that of Goadby. He found in 90 per cent of cases a pure culture of pneumococcus, in the other cases this organism was present together with either staphylococcus or streptococcus; the opsonic index was found to be always low to pneumococcus, slightly low to staphylococcus and normal to other bacteria; the use of streptococcus in the vaccines has not given such good results as the other two.

To explain the activity of the pneumococcus he cites the analogous case of the colon bacillus in appendicitis. This bacillus, usually a harmless inhabitant of the intestine and appendix, becomes virulent only when the mucosa is rendered abnormal by irritation or injury. Similarly, the gum at the point of contact with the tooth is the part most exposed to injury by calcific deposits around the neck of the tooth and so is more easily invaded by the pneumococcus which is always present, but is harmless to the normal mucous membrane.

Both writers conclude that the proper application of the opsonic treatment, combined with local cleanliness, produces the most satisfactory result in these cases.—(ASST. SURG. L. W. JOHNSON.)

GENERAL MEDICINE.

Surg. T. W. RICHARDS, U. S. Navy.

CABOT, RICHARD C., M.D. **Normal auscultatory differences between the sides of the chest.** Am. Jour. Med. Sciences, December, 1909.

It has long been well understood that physical examination reveals important differences in the normal apices of the two lungs, but in this paper the writer points out similar, though less constant, findings upon auscultation at the bases. It was noticed in 67 per cent of 250 healthy cases recently examined that the breathing at the left base was louder and harsher than at the right. This phenomenon was sometimes present in the morning and absent in the evening, and seemed to be distinctly less common in persons under 20 years of age. There were no corresponding differences in palpation or percussion.

Additional experiments were made to determine accurately the differences in the phenomena elicited in the upper and lower lung by palpation, percussion and auscultation with the patient in the lateral recumbent position, when there is obviously restriction of motion of one side of the thorax. The findings were—

(a) On palpation, increased tactile fremitus on the lower side; (b) on percussion, a combination of dullness with a tympanic quality on the lower side; (c) on auscultation, an increase in the intensity of the spoken and of the whispered voice, with a slight prolongation of expiration and a raising of its pitch.

Summarily stated, these signs amount to the indications of a slight degree of condensation of the lung, such as we see in the upper part of a chest when a pleural effusion is present below.

It also appears that lateral decubitus increases the number of audible râles, if any, in the lower side.—(T. W. R.)

POTTENGER, F. M. **The outlining of normal organs and the diagnostication of diseased conditions of the pleura and lungs by means of palpation.** Interstate Med. Jour., Vol XVII, No. 12, December, 1909.

The author describes two methods as new to the medical profession, viz:

Muscle rigidity.—This is a feeling of resistance noted on palpating the muscles which overlie inflammatory conditions affecting the pulmonary parenchyma or pleura; it is due to a tonic spasm, or, in chronic cases, a pathological change in the muscle; in the latter condition there is also a “doughy” sensation.

This sign is most marked in patients whose lungs and pleura have not been previously the seat of chronic inflammation, but when examined are affected by an active process; the muscle being normal, we have the greatest degree of muscular spasm. Being apparent in

acute pleurisy, pneumonia, and early active tuberculosis, this sign is considered particularly important as an aid to early diagnosis.

Light touch palpation.—While “muscle rigidity” is confined to the muscles alone, the difference in resistance elicited by this means applies also to underlying tissues, and may be used in outlining normal organs or areas of disease marked by local increase in density. Deep palpation must be avoided, only the lightest touch on the skin being required. Palpation should be confined to the soft tissues if possible; thus in outlining the heart begin wide of the border in an intercostal space and gradually approach, the border of the organ being recognized by a slight feeling of resistance to the palpating finger.

While difficulties arise if the chest is covered with hair, when the subcutaneous tissues are too thick or very thin, if palpating through the sternum, or if the ribs form an acute projecting angle, the method as used by the writer has given very accurate results.—
(T. W. R.)

ABRAHAM, ROBERT, M. D. Two signs of diagnostic value; one in chololithiasis, the other in incipient pulmonary tuberculosis. New York Med. Jour., January 8, 1910.

The sign, which in the writer's opinion, is “as pathognomonic of chololithiasis as McBurney's point is of appendicitis,” consists in a painful point midway between the umbilicus and the ninth costal cartilage in the right hypochondria. To elicit it the patient is placed in the recumbent position with arms and legs extended; the index finger, with a sudden thrust, is then pressed into the designated spot. “The effect on the patient is like an electric shock; there is either a grimace on the face denoting suffering or a quick involuntary jump of the abdomen as if it were struck with a pointed instrument. As often as the finger thrust is repeated just as often is the painful response obtained.”

“In an acute attack with a diffuse area of hyperaesthesia the midway point mentioned is the point of maximum pain. In chronic cases the painful point is present at all times, while the whole area around it may enjoy freedom from sensitiveness.” Abrahams is “convinced that no other disease of the liver or gall bladder or any adjacent organ will produce this phenomenon,” and he has demonstrated the sign for years.

The diagnostic sign in incipient pulmonary tuberculosis he designates as “the cutaneous temperature.” It was pointed out many years ago by Peter, but has never been in general use. A clinical thermometer is placed at the supraclavicular space of one side, covering the bulb snugly and completely with folds of skin. At the end

of four or five minutes the thermometer is removed and the temperature noted. The same is done at the other supraclavicular space and the temperatures compared. In case both apices are involved these temperatures will be higher than the axillary, and the apex most affected will give a higher reading than that of the opposite side. The difference, as above, was noted regardless of the time of day, but was most marked between 4 and 6 o'clock p. m. The smallest difference ever registered was 0.6° and the highest 2° F. In cases showing physical signs of tuberculous infiltration, but in which the process has been arrested or cured, there is no difference in temperature on the two sides.

If we have here a means of distinguishing a local, active process from one which is passive and harmless this test gives most important aid in just those cases where the tuberculin reaction is least informing.—(T. W. R.)

HARMAN, N. BISHOP. The "Diaphragm test" for binocular vision. Proc. Roy. Soc. Med., vol. 11, No. 7, May, 1909.

The instrument used by the writer, and illustrated herewith, consists of a length of wood like a flat ruler 44 cm. long, fitted with a rack at one end to receive the test cards, and a screen measuring 9 cm. by 6 cm. fixed at 11 cm. from the rack. In this screen, or diaphragm, a hole is cut; it is either square or round and measures 1.7 cm. square or in diameter. A movable pin is fixed to the diaphragm, so that it can be projected into the hole as a point of fixation in certain experiments. A handle is fixed beneath the baseboard (fig. 2).

Method of handling.—In use the patient holds the handle with both hands and places the free end of the rule (this is washable) against the upper lip just beneath the nose. The surgeon stands facing his patient and holds the other end of the instrument to keep it steady. When the instrument is in position the patient is asked to look either through the hole or at the pointer projecting into it, according to the test desired, and to tell what he sees through the hole.

Test cards.—There are three sorts: (1) Printed matter, of any size from diamond in set paragraphs to canon in single capitals; (2) black or colored squares variously disposed; (3) pictures for children.

The test may be used:

- (1) To determine the equality of visual acuity in the two eyes.
- (2) To determine the presence, the absence, or a defect of binocular vision.
- (3) To exercise the vision in squinting eyes.

(4) To detect malingerers feigning monocular blindness.

(5) To demonstrate certain physiological phenomena connected with the perception and suppression of images.

As the fourth of these is of especial interest in view of the occasional cases which occur in the reexamination of recruits, it is given practically in full.

For this purpose test cards are used with squares printed thereon, colored red and green. The squares are printed right and left; any number may be used, but one each side is enough, and the patches are on different lines, so that they can not be fused by convergence. The cards are reversible, so that the red and green cards can be exhibited four different ways, red to right, to left, above, or below.

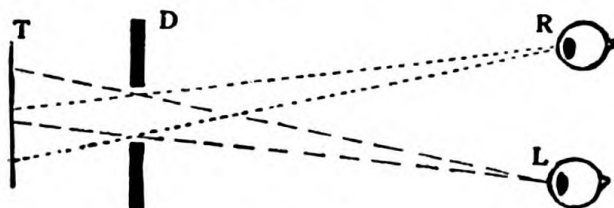


FIG. 1.

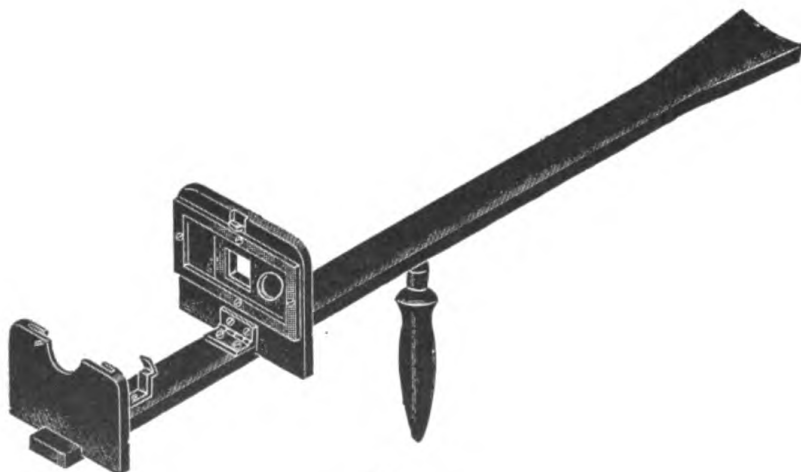


FIG. 2.

One of these cards is put in the rack, and the patient is asked what he sees: (1) He may be told to look through the hole; then he sees the patches as they are on the card and must name them. Suppose—an extreme improbability—the man knows the patches are seen by crossed vision and correctly evades naming the patch seen by the pseudoamaurotic eye; yet he does not escape, for the surgeon watching the man's eyes will see the coordinate movements of the eyes as he looks from one to other area of crossed vision. *A man truly blind of one eye does not do this.* In fact the occurrence of this coordinate movement of the eyes is so definitive that it is not necessary to invite

the man to perjure his soul by requiring an answer by his mouth—the true answer is given unconsciously by the movement of the eyes.

(2) The man may be told to look at the pointer and so converge; then he gets homonymous diplopia for the patches, and one appears above the other (fig. 4). When seen in this latter fashion it is impossible for the patient to guess whether one or other eye, or both

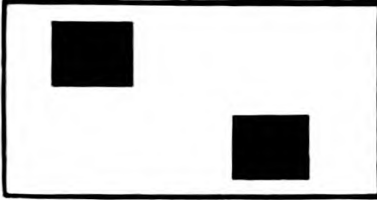


Fig. 3.

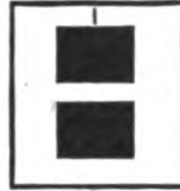


Fig. 4.

FIG. 3.—Arrangement of test card with colored patches.

FIG. 4.—The same test card seen in the hole of the diaphragm when the eyes are fixed on the pointer projecting into the upper part of the hole.

eyes, sees the patches; even the cards may be changed so that the red is seen by the right and left eyes alternately, yet the change will not be detected. During the testing the surgeon has the man's eyes under perfect observation; at the suggestion of a wink the test can be dipped and obscured.

To test equality of visual acuity in the two eyes a paragraph of print (fig. 5) is put in the test rack. The right half is read by the

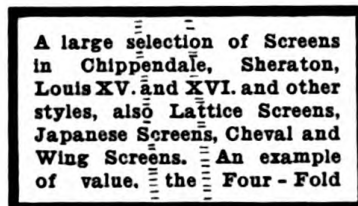


FIG. 5.

The dotted lines show the overlapping of the crossed images of the hole in the diaphragm.

left eye, the left half is read by the right eye, and the middle strip by both eyes, so that if all the letters are equally distinct there is no difference in the vision of the two eyes. A small degree of latent squint, however, will also prevent a man from reading the paragraph correctly, but this defect may be more readily shown by a single line of letters or figures, thus:

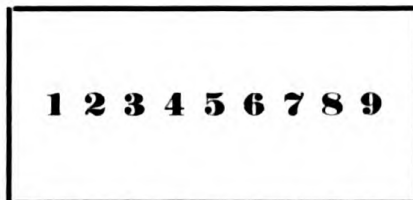


FIG. 6.

The man with good binocular vision reads 1234 with the right eye, 6789 with the left, and 5 with both eyes (fig. 6).

In latent convergence (esophoria) the middle letters overlap and are suppressed, so that the man reads something like this:

126789

In latent divergence (exophoria) the middle letter is reduplicated, and the man reads:

12345 56789

In latent vertical displacement (hyperphoria) the parts of the line of letters seen by each eye are on different lines or levels, thus:

12345

56789

All these phenomena can be seen by the surgeon himself, who has perfect binocular vision, when he causes disturbance of his muscles by simply displacing one eye slightly by pressure with the finger.

The apparatus herein described is so simple and the results attainable so striking that it would seem worthy of trial at some of our larger training stations, where numbers of recruits are reexamined. Perhaps, for sanitary reasons, it would be an improvement to have an arrangement for covering the "washable" end of the rack with a fresh strip of paraffin paper, or some similar device, each time the instrument is used.—(T. W. R.)

REPORTS AND LETTERS.

REPORTS ON THE CARE OF WOUNDED, BLUEFIELDS, NICARAGUA.

[By Passed Asst. Surgs. W. S. PUGH, Jr., L. H. WHEELER, and Asst. Surg. D. G. SUTTON,
U. S. Navy.]

I respectfully submit the following report of the establishment and work done at the United States Naval Emergency Hospital, Bluefields, Nicaragua, from the beginning until the present time. In this report I shall consider only the medical and surgical conditions encountered, as a separate report will be submitted by Paymaster Grant on maintenance and commissariat.

In obedience to your order of December 21, 1909, 9.30 p. m., Asst. Surg. D. G. Sutton and I left our respective ships and proceeded to Bluefields, Nicaragua, to assist the local physicians in the care of the sick and wounded brought here after the battle at Recreo, December 20, 1909. We were accompanied by Hospital Steward B. Douglas, U. S. Navy, of the U. S. S. *Tacoma*, and Hospital Apprentice (first class) C. E. Tieman, U. S. Navy, of the U. S. S. *Des Moines*, with the regulation U. S. Navy field outfits. Upon our arrival at Bluefields, 10.45 p. m., we were met by United States Consul Moffat, who directed us to the Hospital de Sangre, at that time in charge of Dr. C. E. Flannigan, a local physician. After an investigation of this institution, it soon became apparent that all the wounded there had been well taken care of, and required no further treatment that night.

While at the Hospital de Sangre we learned that very little preparation had been made in the town to receive other wounded, and that several hundred were expected the following night. We saw at once it would be necessary for us to establish as soon as possible an emergency hospital for the reception and treatment of the wounded yet to arrive.

We then looked over the town and found the only available building was one situated on the main street and about to be used as a hotel.

Our assistants were then sent to the hotel for the night and Doctor Sutton and I proceeded to the office of the American consul and there spent most of the night planning the organization of a hospital on the morrow, and making all necessary requisitions for supplies from the ships and other sources.

Requests for assistants and supplies were sent as early as possible next morning. About 8.30 a. m. a launch arrived from the U. S. S. *Des Moines* with a carpenter, who was detailed for construction duty. A pay clerk was detailed for duty as the representative of the supplies and accounts department. With them were one master-at-arms, one hospital apprentice, first-class, one ship's cook, and an assistant, and twelve assistants detailed from the U. S. S. *Des Moines* and the U. S. S. *Tacoma*, and also the supplies requested.

Upon their arrival the details were at once announced and men started to fit up the building selected as a hospital site. The basement in the rear was selected as a galley and mess hall for the ship's force and answered the purpose well. The two rooms in the rear of the first floor of this building were converted into an operating room and a sterilization room. The main hall on the first floor was kept as a reception room for patients temporarily.

The entire second floor, with the exception of one small room, was made into a ward large enough to hold forty patients. A small hallway in the rear of the second floor was used as a wash room for patients, and by screening off a portion of this hallway another compartment was afforded for moribund patients. The small room in the rear of the second story was used as a temporary quarter for the crew.

An old house across the street was used as a galley for the patients. Arrangements were made for an abundant supply of water from neighboring tanks, both for washing and drinking purposes. All refuse material was dumped into the lagoon and carried out to sea.

While these arrangements were being made in the building proper Pay Clerk Hunter was busily engaged making purchases and arranging for the feeding of our assistants and for the patients. Another detail was busy building cots at the government barracks, and in a short time we had about one hundred cots in the building. By 4 p. m. of the 22d the hospital was in running order and ready to receive patients. At 6 p. m. a river boat arrived from Rama with two patients, who were at once treated and sent to the upper ward.

All was now quiet until 11.30 p. m., when the whistles of the steamers *Hendie* and *Cukr* announced their arrival with patients. In a very short while after this our large reception room, porch, and the side street were filled with patients waiting to be treated.

As all details had been carefully prepared the patients were quickly examined by officers and men detailed for that purpose, the most serious cases being soon found and taken into the operating room in order of need so far as possible.

During the night, that is between midnight and 10 o'clock the following morning, one hundred and twenty-five patients were treated in this institution. We selected the most serious cases, particularly

those unable to move about, and kept them in the hospital, about forty in number; most of the others were ambulant cases, and these, after having their wounds treated, were sent to other buildings which were being prepared to receive them.

The condition of the patients treated in this institution was pitiful in the extreme. They were lean and greatly emaciated, some of them having had no food for two, three, or four days. Their wounds had been very much neglected, many of them being covered with dirty paper, old rags, leaves, knapsacks, cartridge bags, etc. As a result of this, most of the wounds were found full of pus and gangrenous tissue. Many of the wounds were even found to contain maggots, which latter breed very quickly in this country.

The bad condition of the wounds is perhaps due to the fact that some of the men were lost in the bush for days before being picked up. By noon of the following day, December 23, everything was in good shape, all patients had been dressed, were quiet, and the wards clear and orderly. Considerable difficulty was experienced the first night in getting patients to use their cuspidors, the natives being in the habit of expectorating in whatever place seemed most convenient. By gentle but firm means this practice was soon controlled.

After all temporary treatment had been given the patients and the reception hall thoroughly cleaned up and disinfected, the latter was then fitted up as a dormitory for officers and men. Evening inspections of the hospital revealed everything in splendid working order, the wards and entire building, both inside and out, were immaculate in appearance. Everyone was resting comfortably, all patients and helpers were well screened from the mosquitoes, and all sanitary precautions were taken.

A fire bill was also made out and everyone knew his detail. In addition a daily routine was prepared and strictly adhered to.

Patients treated.—In all one hundred and twenty-five patients were treated the first night. Of these seventy-five were ambulant, being mostly penetrating wounds of the arm and superficial wounds of the chest and leg. Ten were penetrating wounds of the leg and hip region, but not very severe. These men were given treatment and then sent to other places. Forty of the cases appearing to be most severe were taken into the wards.—(PASSED ASST. SURG. W. S. PUGH, JR.)

I have the honor to submit a report on the sanitary and medical conditions of a camp established at Bluefields Bluff, Nicaragua, for the care of prisoners from the Nicaraguan government troops surrendered at the battle of Recreo.

The camp was established December 25, 1909, and abandoned by the officers and enlisted men of the United States Navy on duty on January 16, 1910.

I was attached to the camp from December 27, 1909, until January 2, 1910, and from January 8 until January 15, inclusive.

The camp may be divided into two portions for the purposes of description—"Campo Americano" and "Campa Marta." The former was located on a stretch of flat, sandy soil separating the entrance to the lagoon from a swamp. The majority of the prisoners were at this camp, quartered in two barracks and several thatched huts. The barracks had corrugated zinc roofs, there were wooden floors, and the sides were made of interlaced palms, affording good protection from sun and rain and natural ventilation. A frame house was also built containing an office, mess room, sleeping quarters, and kitchen for the enlisted men of the navy on duty at the camp. There was another frame building used as a bread storeroom. Two tents were in use, one as officers' quarters and another for the storage of commissary supplies. All of these buildings were hastily constructed to meet the requirements of an emergency.

Campa Marta was located on elevated and sloping ground about a quarter of a mile from the American camp. This comprised a group of frame buildings previously used as barracks for the garrison. Notices in Spanish were posted in every building of the camp warning against spitting on the floor. Trenches were dug to carry away surface water. Both camps were well exposed to the northeast trade winds. I saw but four mosquitoes during my stay, very few flies, and none of the latter near the kitchens or storerooms. Refuse about the camp was removed and burned. Special attention was given to the prompt disposal of horse and cow manure.

The average number of rations issued per meal was 777. The prisoners upon their arrival were poorly clad, usually in two garments, a shirt or coat and trousers. Most of them were without shoes and many had no blankets.

The rations, provided by the "Red Cross" appropriation, were composed of coffee with sugar and evaporated cream, bread, which was baked on board the U. S. S. *Prairie*, rice, and meat and vegetable soups, which were prepared and issued by a detachment of enlisted men from the U. S. S. *Tacoma*. The general gain in strength was very noticeable.

The water used at Campa Marta was obtained from a cistern. At Campo Americano the source was at first a well, removed from the camp, other dwellings, and cultivated ground. A sentry from the guard was posted near to prevent contamination of the surrounding soil. Unfortunately there were no facilities for boiling water. Later gutters were constructed on the barracks and the frequent showers provided an adequate water supply. Distilled water from the ships was used at the officers' and enlisted men's quarters. A latrine was built at the Campo Americano over the entrance to the

lagoon, the current carrying the excreta out to sea. A dry-earth closet was used at Campa Marta.

I was informed that there was an extensive epidemic of dysentery among the troops during the march from Managua. About ten cases came under my observation at the camp. For a month or more previous to their admission to the camp the prisoners had subsisted on bananas and sugar cane, accountable, I think, for the numerous cases of dilatation of the stomach. I saw two cases of valvular heart disease with broken compensation, and several in the terminal stages of pulmonary tuberculosis. There were many cases of exacerbations of malarial fever, and enlargement of the spleen was found in nearly every patient examined. I regret the conditions precluded microscopical work.

In view of the prevalence of hookworm infection, members of the American squad on duty at the camp and the crews of boats stopping at the camp wore boots or shoes.

One death from malarial cachexia and secondary anemia occurred during the first week after the establishment of the camp.

Aside from cases of coryza and mild bronchitis, I saw no case of illness which I considered attributable to camp conditions. The surgical work was limited to the treatment of infected abrasions, abscesses, and ulcers of tertiary syphilis; about twenty of the latter cases were dressed daily.

Several talks were given through an interpreter on the subjects of personal hygiene, the transmission of pulmonary tuberculosis and malarial fever, and the danger of soil pollution.—(PASSED ASST. SURG. L. H. WHEELER.)

I have the honor to submit the following report of the work done at the United States Naval Emergency Hospital, Bluefields, Nicaragua, during the period extending between January 15 and February 2, 1910, when the institution was closed.

Upon my arrival at the hospital I found twenty surgical cases under treatment, about ten of that number being ambulatory and the remainder confined to bed because of involved limbs or high temperature incident to septic conditions. No new admissions were made at any time, although a number of natives appeared from time to time to have various operations performed, and so the work of the medical officer was confined to the routine surgical dressings and such operations as complications demanded. Only two major operations were necessary, and both of the cases had uneventful recoveries. One of the operations was a rib resection for empyema, and the other was an extensive operation on a thigh case, which was made necessary by an accumulation of pus and the presence of a large lead bullet. With very few exceptions all of the cases were convalescent and the various wounds were doing very well, but the low vitality of the patients, due to exposure and lack of nourishment in the bush, kept

the newly forming granulations from filling in as rapidly as they would have done in normal individuals. Two-thirds of the patients had skin evidences of syphilis, and when they were first admitted the wounds were filled with pus; so, although some had trivial wounds, the recovery was slow and not especially encouraging, but at the time when the patients were turned over to the local physicians there were only two cases that had any suspicion of a remaining infection, and all but possibly two will be ready for discharge as cured within the next ten days.

The hospital at Bluefields was established to care for the wounded from the battle of Recreo, as the local hospitals and physicians had more than they could handle at the time. On February 2, 1910, when the institution was closed, the native hospitals had ample room to care for their wounded, the local physicians were willing to take over the cases, and our surgical stores obtained from the U. S. S. *Tacoma* and U. S. S. *Des Moines* were exhausted, as well as those received through the medium of the American Red Cross Society. In other words, the actual need for the hospital had passed, and accordingly the American consul was asked to make any necessary arrangements to have the patients transferred to the various institutions. After the cases were dressed on the morning of February 2, the Nicaraguan authorities sent stretcher bearers and the patients were divided between the Hospital Colon and the Hospital Central, both being under government supervision. The cases of a more serious nature were sent to the Hospital Central, where they will be under the care of an American surgeon who has done splendid work since the local revolution began. A complete history of each patient was made out and sent to the respective hospitals to guide the physicians in subsequent treatment. In the period covered by this report no deaths occurred, there were no further evidences of tetanus and no new intestinal parasitic cases developed, but many of the patients who had malignant malaria from the start had a few remissions. We were unable to give quinine hypodermatically because of the untrained assistants in the ward, but in a majority of the cases the drug had the desired effect by mouth.

On the day of closing all property was assembled, listed, checked, and returned to the source from which it was originally obtained. The surgical instruments, dressings, and appliances landed from the two ships were sent back, the furniture and supplies purchased by the American Red Cross Society were turned over to the local representative of the society, Mr. Moffat, and all property borrowed from the residents at Bluefields was returned in good condition. I wish to take this opportunity to state that the people of Bluefields met our every request with a will, and if it was possible to get what we asked for the request was granted with the assurance that "Anything you want we will give, if we have it." That spirit assisted our

officers and men to a great extent and made seemingly impossible projects possible. All bills incurred in establishing and operating the hospital have been submitted to the local representative of the American Red Cross Society. The entire cost of equipping the hospital, supplies needed, dressings, and subsisting the patients and employees from the beginning until the hospital was closed was \$1,637.79. The average cost of treatment and subsistence per patient was \$1.56 per day. The estimate is based on the number of patients admitted to the hospital proper.

In the former report submitted by Doctor Pugh he gave a summary of patients treated, admissions to the hospital, operations, and deaths. In order to guard against any possible duplication of figures and totals in the final summary, I will make such additions as are necessary and will submit the figures and data covering the whole period from December 21, 1909, to February 2, 1910.

SUMMARY.

Cases not admitted to the hospital, but treated:

1. Gunshot wounds, chest, superficial.....	16
2. Gunshot wounds, arm and shoulder, superficial.....	21
3. Gunshot wounds, forearm, superficial.....	26
4. Gunshot wounds, back, superficial.....	9
5. Gunshot wounds, hip superficial.....	10
6. Gunshot wounds, thigh and leg, superficial.....	3
Total	85

Cases admitted to the hospital:

1. Gunshot compound fracture comminuted, hip.....	2
2. Gunshot compound fracture, leg.....	6
3. Gunshot compound fracture, shoulder.....	1
4. Gunshot wound compound fracture, hand and wrist.....	2
5. Gunshot wound compound fracture, forearm.....	3
6. Gunshot wound, groin.....	1
7. Gunshot wound, back and scalp.....	1
8. Shell wound, chest and lung with septic pneumonia.....	1
9. Shell wound, chest	2
10. Shell wound, chest anterior and posterior and left thigh.....	5
11. Shell wound, covering entire left side of face.....	1
12. Gunshot wounds, right and left hip.....	4
13. Gunshot wounds, right shoulder and chest.....	1
14. Compound fractures, right arm, middle finger left hand, compound comminuted fracture right forearm, compound fracture third finger left hand, shell wound left leg, gunshot wounds, penis and scrotum.....	1
15. Shell wound, right foot.....	2
16. Gunshot wounds, right thigh, scrotum and penis.....	1
17. Malignant malaria and small wound, thigh.....	1
18. Extensive infection, machette wound, right foot.....	1
19. Dysentery and small wounds, thigh penetrating.....	3
Total	40

Operations performed:

1. Plastic operation, face.....	1
2. Removal necrotic bone, hand.....	2
3. Removal necrotic bone, leg.....	6
4. Removal necrotic bone, pelvis.....	4
5. Removal necrotic bone, foot.....	2
6. Amputation, thigh.....	3
7. Amputation, leg.....	1
8. Amputation, arm.....	3
9. Amputation, shoulder.....	1
10. Amputation, fingers.....	2
11. Rib resections.....	4
12. Bullets and shells removed, hip.....	9
13. Bullets and shells removed, leg.....	13
14. Bullet and shell wounds, arm.....	20
15. Bullet and shell wounds, chest.....	8
16. Bullet and shell wounds, thigh.....	10
17. Bullet and shell wounds, groin.....	1
18. Operations for drainage.....	14
<hr/>	
Total.....	104

Deaths:

1. Tetanus.....	2
2. Septic pneumonia.....	1
3. Gangrene and sepsis.....	2
4. Suicide.....	1
5. Shock associated with golter and heart disease.....	1
6. Infection of brain following extensive destruction of face.....	1
<hr/>	
Total.....	8

Looking back over the work accomplished here I appreciate the fact that the good results attained were made possible to a marked degree by the efforts of untrained men, especially those from the *Tacoma* and *Des Moines*. An ordinary seaman was given charge of the sterilization of instruments and the making of antiseptic solutions, and in twenty-four hours after being instructed in his various duties we had confidence in him and at no time did recognizable mistakes occur. A seaman was made an assistant in the operating room, where he did good work, and toward the end of our stay he was allowed to prepare patients for operation and to assist in giving anæsthetics. The various men detailed as nurses in the ward did the work assigned to them in commendable style; they kept order, trained the patients in personal hygiene, and became very accurate in taking temperatures. At no time during the period which I have been in charge has there been any breach of discipline, and the people of Bluefields have spoken frequently of the unusual good behavior of the men on liberty.

The commissary department of the hospital, which was operated under the personal supervision of the pay officer of the *Des Moines*,

was satisfactory to the highest degree, even although the local market was limited as to variety during the whole period. Numerous special diets had to be given to various patients during hyperpyrexial periods and in more than one instance life was saved through this means.—
(ASST. SURG. D. G. SUTTON.)

REPORT ON PHYSICAL TRAINING AT THE UNITED STATES NAVAL ACADEMY.

By Passed Asst. Surg. W. N. McDONELL, U. S. Navy.

In October, 1908, the old system of physical and strength measurements was discarded and a new system adopted. The reason for this change was because of the fact that the old system did not give an accurate idea of a man's physical development. One could learn a few gymnasium tricks and in a competitive strength test could easily win over another who was not so prepared, but who in reality was much stronger and better developed. In place of the old apparatus the Kellogg universal dynamometer was substituted for determining strength and muscular development. With this machine and by the present system a fairly accurate idea can be obtained of a man's physical development, or lack of development. It is recognized that relative immaturity is a potent cause of predisposition to strain and its harmful effects, and likewise that strain from such sources is usually unavoidable, because we have at present no trustworthy means of accurately determining an individual's maturity. It is hoped that certain roentgenographic studies now being carried on will afford us a reliable means of estimating the maturity of any individual; if this expectation is realized, a most valuable and far-reaching aid will have been acquired for the study of physical problems.

From results in the strength tests of the entire brigade of midshipmen, with the dynamometer, a set of averages was determined, the men being classified according to height. While classification according to height may work a hardship on a few, and especially some of the taller men, it was proven that, generally speaking, a man's strength is in direct proportion to his height.

The midshipman is given a strength test upon entrance to the academy and a chart is made out, in duplicate, which shows his muscular development as compared with the development of the average midshipman of his height. One chart is retained as part of his record and the other is given to him with his deficiencies indicated. On these charts and opposite each muscle, or group of muscles, are numbers which indicate special apparatus in the gymnasium that should be used to develop the different muscles of the body. In addition those found physically deficient are organized into gymnasium

squads and required to take special gymnastic work four afternoons a week.

Prior to this year the only compulsory gymnasium work that was required was taken by members of the fourth class, and that amounted to but four hours a month, beginning the second week in November and continuing until the first week in March. The result of this was that only those who were athletically inclined ever took any regular gymnasium work after having completed their fourth year, while those who were physically indolent and who really needed regular physical exercise kept away from the gymnasium. In a report made early in the year I called attention to the fact that the physical education of the young men was being neglected and pointed out the consequence that many of them were being found physically deficient in their annual physical examination, and also the fact that if more attention were paid to their physical education it would help them a great deal in their mental efforts. Compulsory gymnasium work was recommended to continue throughout the entire four years' course. A board was then ordered to look into the matter, and after studying the question it recommended that more time and attention be paid to the physical education of the midshipmen.

Gymnasium work was not made compulsory for the entire course, but an order was published to the effect that all midshipmen found physically deficient would, on the recommendation of the medical officer in charge of physical training, be required to take such work as he prescribed and considered necessary for their physical development. These men are reexamined from time to time, and when they reach the general average required for men of their height they are excused from further compulsory work with the special gymnasium squad.

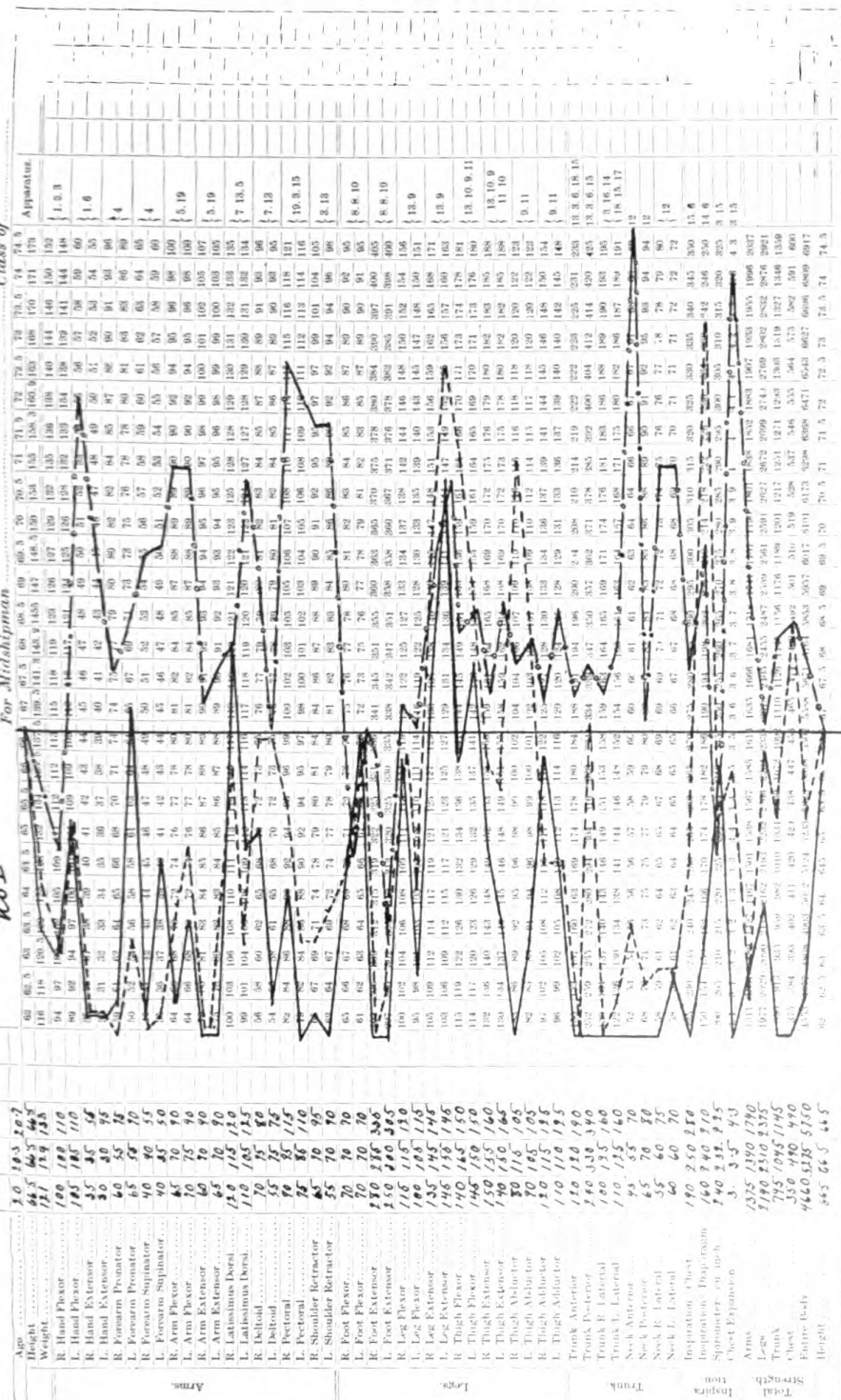
During the past year the "weak squad," as it was christened by the midshipmen, has been well represented by men from all classes. Others, fearing that possibly they might not qualify physically and thereby be elected to this squad, were stimulated to do special work and prepare themselves for the test.

In practically every instance the members of this special squad have shown the good effects of such work. They have all increased in weight, strength, military bearing, and general good health. They have also been convinced of the fact that regular systematic exercise is beneficial and will continue no doubt in the majority of cases to exercise more regularly in the future.

The course in physiology and hygiene has been as practical as possible. Enough anatomy and physiology is taught to enable the midshipmen to intelligently understand the reason and necessity for following certain hygienic rules of living. First aid to the injured, such as control of hemorrhage, resuscitation of the apparently

PHYSICAL CHART.
Classified and Arranged According to Heights from 62—74.5 in. Arranged from Results Obtained in Testing 800 Midshipmen.

1907 1908 1909 1910
June Sept. Jan. May



PHYSICAL CHART.
Classified and Arranged According to Heights from 62—74.5 in. Arranged from Results Obtained in Testing 800 Midshipmen.

PHYSICAL CHART.

Classified and Arranged According to Heights from 62—74.5 in. Arranged from Results Obtained in Testing 800 Midshipmen.

For Midshipman

Class of

70.4

Age	Height	Weight	R. Hand Flexor	L. Hand Flexor	R. Hand Extensor	L. Hand Extensor	R. Forearm Pronator	L. Forearm Pronator	R. Forearm Supinator	L. Forearm Supinator	R. Arm Flexor	L. Arm Flexor	R. Arm Extensor	L. Arm Extensor	R. Latissimus Dorsi	L. Latissimus Dorsi	R. Deltoid	L. Deltoid	R. Pectoral	L. Pectoral	R. Shoulder Retractor	L. Shoulder Retractor	R. Foot Flexor	L. Foot Flexor	R. Foot Extensor	L. Foot Extensor	R. Leg Flexor	L. Leg Flexor	R. Leg Extensor	L. Leg Extensor	R. Thigh Flexor	L. Thigh Flexor	R. Thigh Extensor	L. Thigh Extensor	R. Thigh Abductor	L. Thigh Abductor	R. Thigh Adductor	L. Thigh Adductor	Trunk Anterior	Trunk Posterior	Trunk R. Lateral	Trunk L. Lateral	Neck Anterior	Neck Posterior	Neck R. Lateral	Neck L. Lateral	Inspiration - Chest	Inspiration - Diaphragm	Spirometer - cu. inch	Chest Expansion	Arms	Legs	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	Trunk	Chest	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Classified and Arranged According to Heights from 62—74.5 in. Arranged from Results Obtained in Testing 800 Midshipmen.

Sept. 17, 1909

Numbers opposite, muscles or groups of muscles indicate Gymnasium apparatus to be used in developing these muscles.

PHYSICAL CHART.

Classified and Arranged According to Heights from 65—74.5 in. Arranged from Results Obtained in Testing 800 Midshipmen.

Vol. II

For Midshipman

Class of

Age	10/9	10/10	10	10	19	20	20.5	21	21.5	22	22.5	23	23.5	24	24.5	25	25.5	26	26.5	27	27.5	28	28.5	29	29.5	30	30.5	31	31.5	32	32.5	33	33.5	34	34.5	35	35.5	36	36.5	37	37.5	38	38.5	39	39.5	40	40.5	41	41.5	42	42.5	43	43.5	44	44.5	45	45.5	46	46.5	47	47.5	48	48.5	49	49.5	50	50.5	51	51.5	52	52.5	53	53.5	54	54.5	55	55.5	56	56.5	57	57.5	58	58.5	59	59.5	60	60.5	61	61.5	62	62.5	63	63.5	64	64.5	65	65.5	66	66.5	67	67.5	68	68.5	69	69.5	70	70.5	71	71.5	72	72.5	73	73.5	74	74.5	75	75.5	76	76.5	77	77.5	78	78.5	79	79.5	80	80.5	81	81.5	82	82.5	83	83.5	84	84.5	85	85.5	86	86.5	87	87.5	88	88.5	89	89.5	90	90.5	91	91.5	92	92.5	93	93.5	94	94.5	95	95.5	96	96.5	97	97.5	98	98.5	99	99.5	100	100.5	101	101.5	102	102.5	103	103.5	104	104.5	105	105.5	106	106.5	107	107.5	108	108.5	109	109.5	110	110.5	111	111.5	112	112.5	113	113.5	114	114.5	115	115.5	116	116.5	117	117.5	118	118.5	119	119.5	120	120.5	121	121.5	122	122.5	123	123.5	124	124.5	125	125.5	126	126.5	127	127.5	128	128.5	129	129.5	130	130.5	131	131.5	132	132.5	133	133.5	134	134.5	135	135.5	136	136.5	137	137.5	138	138.5	139	139.5	140	140.5	141	141.5	142	142.5	143	143.5	144	144.5	145	145.5	146	146.5	147	147.5	148	148.5	149	149.5	150	150.5	151	151.5	152	152.5	153	153.5	154	154.5	155	155.5	156	156.5	157	157.5	158	158.5	159	159.5	160	160.5	161	161.5	162	162.5	163	163.5	164	164.5	165	165.5	166	166.5	167	167.5	168	168.5	169	169.5	170	170.5	171	171.5	172	172.5	173	173.5	174	174.5	175	175.5	176	176.5	177	177.5	178	178.5	179	179.5	180	180.5	181	181.5	182	182.5	183	183.5	184	184.5	185	185.5	186	186.5	187	187.5	188	188.5	189	189.5	190	190.5	191	191.5	192	192.5	193	193.5	194	194.5	195	195.5	196	196.5	197	197.5	198	198.5	199	199.5	200	200.5	201	201.5	202	202.5	203	203.5	204	204.5	205	205.5	206	206.5	207	207.5	208	208.5	209	209.5	210	210.5	211	211.5	212	212.5	213	213.5	214	214.5	215	215.5	216	216.5	217	217.5	218	218.5	219	219.5	220	220.5	221	221.5	222	222.5	223	223.5	224	224.5	225	225.5	226	226.5	227	227.5	228	228.5	229	229.5	230	230.5	231	231.5	232	232.5	233	233.5	234	234.5	235	235.5	236	236.5	237	237.5	238	238.5	239	239.5	240	240.5	241	241.5	242	242.5	243	243.5	244	244.5	245	245.5	246	246.5	247	247.5	248	248.5	249	249.5	250	250.5	251	251.5	252	252.5	253	253.5	254	254.5	255	255.5	256	256.5	257	257.5	258	258.5	259	259.5	260	260.5	261	261.5	262	262.5	263	263.5	264	264.5	265	265.5	266	266.5	267	267.5	268	268.5	269	269.5	270	270.5	271	271.5	272	272.5	273	273.5	274	274.5	275	275.5	276	276.5	277	277.5	278	278.5	279	279.5	280	280.5	281	281.5	282	282.5	283	283.5	284	284.5	285	285.5	286	286.5	287	287.5	288	288.5	289	289.5	290	290.5	291	291.5	292	292.5	293	293.5	294	294.5	295	295.5	296	296.5	297	297.5	298	298.5	299	299.5	300	300.5	301	301.5	302	302.5	303	303.5	304	304.5	305	305.5	306	306.5	307	307.5	308	308.5	309	309.5	310	310.5	311	311.5	312	312.5	313	313.5	314	314.5	315	315.5	316	316.5	317	317.5	318	318.5	319	319.5	320	320.5	321	321.5	322	322.5	323	323.5	324	324.5	325	325.5	326	326.5	327	327.5	328	328.5	329	329.5	330	330.5	331	331.5	332	332.5	333	333.5	334	334.5	335	335.5	336	336.5	337	337.5	338	338.5	339	339.5	340	340.5	341	341.5	342	342.5	343	343.5	344	344.5	345	345.5	346	346.5	347	347.5	348	348.5	349	349.5	350	350.5	351	351.5	352	352.5	353	353.5	354	354.5	355	355.5	356	356.5	357	357.5	358	358.5	359	359.5	360	360.5	361	361.5	362	362.5	363	363.5	364	364.5	365	365.5	366	366.5	367	367.5	368	368.5	369	369.5	370	370.5	371	371.5	372	372.5	373	373.5	374	374.5	375	375.5	376	376.5	377	377.5	378	378.5	379	379.5	380	380.5	381	381.5	382	382.5	383	383.5	384	384.5	385	385.5	386	386.5	387	387.5	388	388.5	389	389.5	390	390.5	391	391.5	392	392.5	393	393.5	394	394.5	395	395.5	396	396.5	397	397.5	398	398.5	399	399.5	400	400.5	401	401.5	402	402.5	403	403.5	404	404.5	405	405.5	406	406.5	407	407.5	408	408.5	409	409.5	410	410.5	411	411.5	412	412.5	413	413.5	414	414.5	415	415.5	416	416.5	417	417.5	418	418.5	419	419.5	420	420.5	421	421.5	422	422.5	423	423.5	424	424.5	425	425.5	426	426.5	427	427.5	428	428.5	429	429.5	430	430.5	431	431.5	432	432.5	433	433.5	434	434.5	435	435.5	436	436.5	437	437.5	438	438.5	439	439.5	440	440.5	441	441.5	442	442.5	443	443.5	444	444.5	445	445.5	446	446.5	447	447.5	448	448.5	449	449.5	450	450.5	451	451.5	452	452.5	453	453.5	454	454.5	455	455.5	456	456.5	457	457.5	458	458.5	459	459.5	460	460.5	461	461.5	462	462.5	463	463.5	464	464.5	465	465.5	466	466.5	467	467.5	468	468.5	469	469.5	470	470.5	471	471.5	472	472.5	473	473.5	474	474.5	475	475.5	476	476.5	477	477.5	478	478.5	479	479.5	480	480.5	481	481.5	482	482.5	483	483.5	484	484.5	485	485.5	486	486.5	487	487.5	488	488.5	489	489.5	490	490.5	491	491.5	492	492.5	493	493.5	494	494.5	495	495.5	496	496.5	497	497.5	498	498.5	499	499.5	500	500.5	501	501.5	502	502.5	503	503.5	504	504.5	505	505.5	506	506.5	507	507.5	508	508.5	509	509.5	510	510.5	511	511.5	512	512.5	513	513.5	514	514.5	515	515.5	516	516.5	517	517.5	518	518.5	519	519.5	520	520.5	521	521.5	522	522.5	523	523.5	524	524.5	525	525.5	526	526.5	527	527.5	528	528.5	529	529.5	530	530.5	531	531.5	532	532.5	533	533.5	534	534.5	535	535.5	536	536.5	537	537.5	538	538.5	539	539.5	540	540.5	541	541.5	542	542.5	543	543.5	544	544.5	545	545.5	546	546.5	547	547.5	548	548.5	549	549.5	550	550.5	551	551.5	552	552.5	553	553.5	554	554.5	555	555.5	556	556.5	557	557.5	558	558.5	559	559.5	560	560.5	561	561.5	562	562.5	563	563.5	564	564.5	565	565.5	566	566.5	567	567.5	568	568.5	569	569.5	570	570.5	571	571.5	572	572.5	573	573.5	574	574.5	575	575.5	576	576.5	577	577.5	578	578.5	579	579.5	580	580.5	581	581.5	582	582.5	583	583.5	584	584.5	585	585.5	586	586.5	587	587.5	588	588.5	589	589.5	590	590.5	591	591.5	592	592.5	593	593.5	594	594.5	595	595.5	596	596.5	597	597.5	598	598.5	599	599.5	600	600.5	601	601.5	602	602.5	603	603.5	604	604.5	605	605.5	606	606.5	607	607.5	608	608.5	609	609.5	610	610.5	611	611.5	612	612.5	613	613.5	614	614.5	615	615.5	616	616.5	617	617.5	618	618.5	619	619.5	620	620.5	621	621.5	622	622.5	623	623.5	624	624.5	625	625.5	626	626.5	627	627.5	628	628.5	629	629.5	630	630.5	631	631.5	632	632.5	633	633.5	634	634.5	635	635.5	636	636.5	637	637.5	638	638.5
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drowned, application of emergency dressings, etc., is fully explained; also the mode of transmitting certain of the more common diseases, especially those found in the Tropics, such as malaria, yellow fever, cholera, dysentery, and typhoid fever, is fully explained, as well as the precautions to be taken in order to prevent infection.

The selection of camp sites, camp sanitation, the importance of securing good water supply, etc., are all considered. The chemistry of foodstuffs and the physiology of digestion are studied, and the needs for the amount of the different classes of foodstuffs are explained; the physiology and hygiene of the nervous system and excretory organs are likewise studied. A lecture is given on venereal diseases, in which their prevalence and evil results are made known. One lecture dwells upon the evil results likely to follow the use of alcohol and narcotics. The frequent occurrence of signs of cardiac strain in athletes and others has been a source of concern to this department. The cause of this phenomenon is now being sought and its discovery hastened, we believe, by systematic roentgenographic and cardio-vascular investigations, which are now under way and which will be carried on through the current school year.

Appended are four charts which will illustrate how the records of our physical examinations are made.

In chart No. I the unbroken line indicates how one man stood in his strength test in June as compared with the average midshipmen of his height. As he fell below the general average he was put in the special gymnasium squad and given exercise designed to correct his particular physical defects. In September he was given another examination, which is indicated by the broken line ----- In this examination also he was below the general average required for his height, and was therefore required to continue his special exercises. He was again examined in January, and the record indicated by the dash-dot line shows marked improvement; he was accordingly excused from the special squad.

Chart No. II is that of one of our strong men; his record extended beyond the limits of the chart in every test.

Chart No. III is that of a man who was found deficient in all but two tests; he is now a member of the special squad.

Chart No. IV is that of a very tall man who, on his first examination last July, fell below the general average for a man of his height. He was given special corrective exercises, and on January 10 was re-examined. The later record, indicated by the broken line, -----, shows that he has made marked improvement in his general development and strength. He has also gained in weight.



NO. 3

VOL. 4

UNITED STATES NAVAL MEDICAL BULLETIN

FOR THE
INFORMATION OF THE MEDICAL
DEPARTMENT OF THE SERVICE

LIMITED TO PROFESSIONAL MATTERS AS OBSERVED BY MEDICAL
OFFICERS AT STATIONS AND ON BOARD SHIPS IN EVERY
PART OF THE WORLD, AND PERTAINING TO THE PHYS-
ICAL WELFARE OF THE NAVAL PERSONNEL

JULY, 1910

(ISSUED QUARTERLY)



WASHINGTON
GOVERNMENT PRINTING OFFICE
1910

NAVY DEPARTMENT,
Washington, March 20, 1907.

This United States Naval Medical Bulletin is published by direction of the department for the timely information of the Medical and Hospital Corps of the Navy.

TRUMAN H. NEWBERRY,
Acting Secretary.

SUBSCRIPTION PRICE OF THE BULLETIN.

Individuals to whom this publication may not be sent officially may obtain it upon mailing the cost price in currency or money order to the Superintendent of Documents, Government Printing Office, Washington, D. C.

Single numbers cost 25 cents domestic postage and 31 cents foreign postage prepaid.

Yearly subscriptions (beginning January 1) are \$1 domestic postage and \$1.25 foreign postage prepaid.

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PREFACE.

The publication and issue of a quarterly bulletin by the Bureau of Medicine and Surgery contemplates the timely distribution of such information as is deemed of value to the medical officers and the hospital corps in the performance of their duties, and with the ultimate object that both shall continue to advance in proficiency in respect to all of their responsibilities.

It is proposed that the Naval Medical Bulletin shall embody matters relating to hygiene, tropical and preventive medicine, pathology, laboratory suggestions, chemistry and pharmacy, advanced therapeutics, surgery, medical department organization for battle, and all other matters of more or less professional interest and importance under the conditions peculiar to the service and pertaining to the physical welfare of the naval personnel.

It is believed that the corps as a whole should profit, to the good of the service, out of the experience and observations of the individual. There are many excellent special reports and notes beyond the scope of my annual report being sent in from stations and ships, and by communicating the information they contain (either in their entirety or in part, as extracts) throughout the service, not only will they be employed to some purposes as merited, but all medical officers will thus be brought into closer professional intercourse and be offered a means to keep abreast of the times.

Special attention will be given by the instructors of the Naval Medical School to the review of advances in medical science of special professional interest to the service, as published in foreign and home journals and extracts from these will appear in the bulletin, together with such remarks as the instructors may deem of value to officers on foreign service or sea duty.

Information received from all sources will be used, and the Bureau extends an invitation to medical officers to prepare and forward, with a view to publication, matter on subjects relating to the profession in any of its allied branches.

C. F. STOKES,
Surgeon-General U. S. Navy.

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SPECIAL ARTICLES.

THE ILLUMINATION OF STUDY ROOMS, BEING A REPORT SUBMITTED TO THE SUPERINTENDENT OF THE NAVAL ACADEMY ON THE PRESENT SYSTEM OF LIGHTING THE MIDSHIPMEN'S QUARTERS IN BANCROFT HALL, WITH RECOMMENDATIONS FOR ITS IMPROVEMENT.

[Dated March 16, 1910.]

By Civil Engineer A. L. PARSONS and Passed Asst. Surg. H. W. SMITH, U. S. Navy.

This report is divided into three main parts—

First: A description of the present installation and the work for which lighting is required.

Second: A detailed study of the subject.

Third: A summary, with recommendations for the improvement of the present system.

The outline is as follows:

I. Description of rooms and of work for which lighting is required:

(a) Rooms.

(b) Work.

II. (1) General considerations:

(a) Physiology of the eye.

(b) Amount of light

(c) Distribution of light.

(d) Incidence of light. Bright points and flickering.

(e) Color of light.

(f) Color of rooms.

(g) Window shades.

(h) Desk tops.

(i) Pictures.

(2) Types of illumination:

(a) Indirect.

(b) Direct.

(c) Direct, with suitable shades.

(d) Lamps.

III. Summary:

(a) Requirements.

(b) Experimental work.

(c) Conclusions and recommendations.

(d) Appendices.

Sources consulted:

Gatewood, J. D., Medical Inspector, U. S. Navy:

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Report of Committee on the Lighting of Boston Schools, 1907.

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Welsbach Company.

Eye Comfort System et al.

DESCRIPTION OF ROOMS, AND OF WORK FOR WHICH LIGHTING IS REQUIRED.

(a) *Rooms*.—There are two types of study rooms: One, a large room, 16 by 16 feet, with table 3 feet 9 inches by 3 feet 9 inches in the center, and two bookcases against the wall on opposite sides of the table. Some of these rooms are equipped with beds, wardrobes, and washstands in addition. This large room has one glass panel door and transom opening onto a dimly lighted corridor. A double window is directly opposite this door.

The small room is 8 by 12 feet, opening at end onto a small entry, the rooms being arranged in pairs. A single window is opposite this opening. The entry is connected with corridor by a glass door and transom. The table, 3 feet 9 inches by 2 feet 6 inches, is placed against the wall, between the opening and window, and supports a bookcase 9½ inches deep by 21¼ inches in height. The room is equipped with bed, wardrobe, and washstand.

For the ground and first stories, all rooms have a ceiling height throughout of 11 feet 6 inches; second and third stories 11 feet 1 inch, and fourth story 10 feet 5 inches, the outside rooms of the latter story having a sloping ceiling to conform to roof.

Walls and ceilings are plastered; walls are painted with light reddish brown, matt surface, oil color; the ceilings are dead white, either painted or whitewashed.

Trim is varnished and fairly light in color.

All windows are fitted with slat wood shades, operated by pulleys, and nearly matching trim in color.

The large room is lighted by two adjustable drop lights fitted, in nearly all cases, with metal shades and 40-watt meridian tantalum lamps. In a few of the rooms there are in use two desk lights with semiopaque glass shades finished on the outside with dark green

enamel. The small room is lighted with one desk light with glass shade and lamp described above. This light usually stands on top of the bookcase. Typical large and small rooms are shown on diagram No. 1.

The present system of lighting produces an intense illumination over the area of the table leaving the rest of the room in comparative darkness, so much so that the titles of books in the cases against the wall can be read only with extreme difficulty. This is well illustrated by the following measurements of the illumination on the table plane for the system now in use:

LARGE ROOM, 2 TANTALUM LAMPS, METAL SHADES, BOTTOM 24 INCHES ABOVE TABLE.

	Foot candles.
Center of table.....	7.2
Edge of table (1 foot 9 inches from center).....	2.9
4 feet from center.....	.10
At bookcase (7 feet from center).....	.03

The bottom of the shade on the desk lamp in the small rooms is normally 35 inches above the table. The general illumination is better than in the large rooms, but is far from satisfactory.

(b) *Work*.—Both large and small study rooms are essentially living rooms for the midshipmen throughout their four years' course. The position of the furniture is fixed, the men sitting directly in front or at the side of the study tables, two men in the large and one in the small room. At present all the work is done on the tables, since the small circle of illumination makes necessary the confinement of work to practically one spot. No drawing or other work of a fine character is done in the room, nor are papers or fabrics of a dark color employed. Hence the work for which lighting must be provided is almost exclusively reading ordinary print and writing with the pale blue ink prepared for use in fountain pens.

GENERAL CONSIDERATIONS.

(a) *Physiology of the eye*.—In order that the prompt understanding of succeeding references may be facilitated, a very brief description of the ocular mechanism is introduced. Light, on entering the eye, is refracted by four separate refracting media, finally falling on a light sensitive surface—the retina. The actual transformation of ether waves into sensory nerve stimuli is probably accomplished in certain neuro-epithelial cells of the retina. Of these cells, the “cones” are situated centrally, are adapted to strong light and day vision, and perceive color. The “rods” are situated peripherally, are adapted to night vision and, probably, are sensitive only to

luminosity. The point of greatest acuity of vision is the central point of the retina lying in the visual axis of the eye. The amount of light admitted to the interior of the eye is controlled by a muscular diaphragm termed the iris. This muscle acts reflexly. It is generally believed that the reflex is initiated by a stimulus of light falling on the retina, but Trotter (Illum. Eng. Soc. [England]) claims that the contraction of the iris is due largely to the effect of light falling on the cornea, though partly to that falling on the iris.

The retina may suffer disease and injury from improper illumination, but commonly eye symptoms are induced by strain of the intra-ocular muscles, extra-ocular muscles, or both.

(b) *Amount of light*.—It has been aptly remarked that there is need of devoting as much care to secure suitable minimum intensities as is generally expended in striving for maximum values. Too much illumination quickly brings on conjunctival discomfort, accommodative strain, and retinal fatigue—the last manifested by disturbing “after-images.” Voght (Arch. f. Augenh., LX-Ht., 2-3) speaks of erythropsia also as being caused by excessive light. On the other hand, the effects of insufficient illumination are equally undesirable. They are exemplified to a high degree in the farsighted individual. In such a case the accommodative apparatus, which can be adjusted only with difficulty to the normal reading distance, is thrown into painful spasms by the effort to focus at the short distance assumed in order to obtain clear definition in a dim light. Satisfactory lighting will not correct, nor prevent, eye strain having its origin in errors of refraction; it will, notwithstanding, mitigate the ensuing symptoms, and in mild or normal cases may limit fatigue to easily borne degrees.^a It may then be taken for granted that the most painstaking adjustment of the amount of light to the character of work is of prime importance.

^a Surg. D. N. Carpenter, U. S. Navy, having become interested in the occurrence of eye strain among midshipmen, has succeeded in collecting considerable data on the subject. He has found that symptoms generally arise among those cases presenting refractive errors, chiefly hyperopic astigmatism, that are not brought out by the ordinary test of “reading 20/20ths.” Consequently, he believes that errors of refraction cause more trouble at the Naval Academy than does defective illumination. In support of this belief he states that a large number of the midshipmen admitted during 1909 were refracted at the time of admission. Of this fourth class there was only one man who failed to pass the test in vision, although during the preceding half year there were 342 cases of disease of the visual apparatus recorded among the whole student body.

Doctor Carpenter urges—and we agree with him heartily—that, in order to avoid the occurrence of eye symptoms, compulsory refraction is not less important than good illumination.

The human eye can perceive contrast in surfaces, uniformly illuminated and adjacent, which differ in luminosity by an amount somewhat less than 1 per cent, and it has been found experimentally that the eye is at about its full sensitiveness when the illumination affecting it is between 1 and 2 foot candles. The increased intensity of sensation produced by a stronger stimulus is of no advantage and may be productive of harm.

Furthermore, visual acuity, or the capacity of recognizing fine details, likewise reaches nearly its full value at about 1 foot candle, and is only very slightly increased by illuminations above 2 foot candles. This is true, however, only for certain surfaces. It does not hold, for example, in the examination of dark fabrics, for the amount of light falling on the work does not represent the amount available, which depends largely on the coefficient of reflection of the surface observed. Hence, the apparently high values in the subjoined table, the figures obtained in practice for the classes of work mentioned, are consistent with the low experimental findings.

Details in dark objects, 5 to 10 foot candles.

Drafting on dark paper, 3 to 5 foot candles.

Desk lighting, 2 to 3 foot candles.

Newspaper reading, 2 to 2.5 foot candles.

Reading clear print, 1.5 foot candles.

Writing, 1.5 foot candles.

Thus we see that visual acuity and perception of contrast are at about their maximum with an illumination of 1 to 2 foot candles, and that experience has shown this degree of illumination to be ample for ordinary reading and writing. It would therefore seem that a requirement of $2\frac{1}{2}$ foot candles on the plane of work would be sufficient for the lighting of a study table, and would provide a safe, though not excessive, margin for loss by deterioration of lamps. While it is recognized that individuals will present variations in their requirements, so that what will be normal for one may seem excessive for another, it is, notwithstanding, believed that the standard adopted will enable all to work with comfort and without injury.

In this connection we wish to emphasize the importance of maintaining as nearly as may be practicable a constant voltage if we are to concede any value to the absolute standard of foot candles recommended; for fluctuations in voltage, above or below that normal for the lamp, affect not only the life of the lamp and the color of the light emitted, but also bring about great variations in candlepower. If substantial variations in voltage occur, all care expended in securing minimum light intensities is nullified.

Change with 5 per cent increase in voltage above normal.

	Candle-power.	Watts per candle.
Carbon.....per cent.	+ 30	-15
Metallized (gem).....do.	+ 27	-13
Tantalum.....do.	+ 22	-11
Tungsten.....do.	+ 20	-10

These data show that the candlepower of tungsten lamps is less affected by voltage fluctuation than that of other lamps, but still, even with them, the ensuing variations are unduly great.

(c) *Distribution of light.*—We have felt that the restriction of the circle of illumination practically to the area of the table is a mistake, and that comfortable work should be possible anywhere within an 8-foot circle. This particular dimension is specified since it permits midshipmen to sit beside their tables and read a book held in the hands or lap. Although with the lights recommended there is a considerable falling off in illumination at the periphery of this circle, as is shown by the appended diagrams, it is to be remembered that the illumination so shown is normal to the plane of the table. A book in the hands is naturally held to secure the maximum amount of light, both direct and reflected, and the actual illumination obtained thereby is considerably greater than the normal illumination on the table plane at a corresponding point.

Another point deserving serious consideration is this. If it becomes necessary to place the book being read on the table immediately under the lamp in order to secure sufficient illumination, the reader invariably bends over to the book. In this way a position hygienically bad is forced on the student. It is regretted that lack of space does not permit further discussion in this connection of the far-reaching effects of posture.

The light should be so regularly diffused that the working area exhibits no perceptible unevenness of illumination. Like flickering, bands of light and striæ are trying because of the state of constant unrest induced in the iris and the irregular intensity of the light stimulus on the retina. For the same reasons the room should be free of sharp contrasts, such as are the result of opaque reflectors, blackboards, dark walls, dark window shades, very dark woodwork, etc. Although the circle of adequate illumination should be of reasonable size, it should not embrace the whole room, for it has been found that it is conducive to comfort to have the working area somewhat the more illuminated, and that less actual foot candles are then required. In fact, the falling off in intensity of illumination near and on the walls should be marked, though gradual, because, even if

the walls are illuminated somewhat less than the work, they will appear brighter. This phenomenon, partly psychic, is concerned with retinal adaptation and with the circumstance that the side light falls on the part of the retina most sensitive to luminosity.

It has been suggested that a marked increase of illumination near the center of the table is of further advantage, since, by a slight change of position, more light is made available for difficult work. To what extent this plan should be put into practice is questionable. Although we consider that absolute uniformity of illumination over the working area is almost impossible, and that a gradual variation in light intensity may be desirable, yet we do not believe that such variation—certainly within the area of work—should exceed one foot candle.

(d) *The incidence of light* determines shadows and, to a large extent, glare. The light should fall from one general direction, thus producing a single shadow. This dominant shadow, which is an aid in most occupations, should be thrown from left to right, and slightly from before, backward, the lamp itself being removed by its height from the field of vision. When several light sources of equal intensity are employed, the resulting multiplicity of shadows is annoying, and it becomes difficult to escape unpleasant reflections. The source of light is preferably located on the left side because the shadow cast by the hand is not then thrown across the work. In left-handed individuals, however, the right side is to be chosen.

Glare is caused by an excess of light, direct or reflected, a bright point in a dark field, or by rapid alterations in light intensity. All are more or less dependent on "retinal adaptation," a term applied to the varying sensibility to light possessed by the eye. This power of adaptation is very useful in everyday life, enabling us to see distinctly under greatly varying degrees of illumination. Although it follows that the expression "excess of light" is more or less relative, and that the eye, by means of this adaptive power, can endure for a time an amount of light far in excess of its needs, yet, eventually, if its needs are persistently exceeded, there will appear marked symptoms which are apparently due to retinal fatigue. Night blindness is an example.

Rapid alterations in light intensity are intolerable since neither the iris nor retina has time to adjust itself to the alternation of light and darkness. Likewise, the glare of a bright point of light is due to this phenomenon of dark adaptation.

The eye is somewhat protected from light from above by overhanging eyebrows, and is inured to skylight by racial experience, but it has no such protection from light reflected from below, which, in excess, is particularly productive of the sensation of glare. The

amount of reflection depends more on surface than on color. There is no ink so black that there is not some reflection from it. As the illumination increases, the increment of light reflected from the white paper is not so appreciable as the increment from the ink, and the ink then apparently reflects relatively more light than the surrounding surface. Reading contrast is thus diminished by glare.

Sharp definition, also, depends largely on contrast between the retinal image and the surrounding area of the retina. (J. H. Parsons, Soc. of Ill. Eng. [England].) By a physiological process pointed out by Hering, known as spatial induction, the sensitiveness of the surrounding retina is relatively depressed, particularly at the junction. Flooding the retina with light must necessarily diminish this reciprocal action and diminish the sharpness of the definition of the image.

Glare affects the pupil also. The iris tends to contract strongly in order to exclude the excess of light from the eye, and thus is loaded with unnecessary work. Yet, the retina does not escape even so, since the reception by it of the stimulus is essential to the starting of the pupillary reflex. The lack of clear definition acts similarly to contract the iris.

We may conclude that glare must be prevented. To this end, the light should not be much in excess of actual requirements. It should be steady, and its source should be fixed, carefully located to avoid direct reflection and either removed from the field of vision, or suitably shaded.

(e) *Color of Light*^a.—The three primary colors are red, green, and blue. These, properly "mixed," produce the sensation of white light. Yellow light may be conceived as white light minus the blue. Violet light is an important constituent of the light coming from certain artificial sources, but is of very little aid to vision.

Shanze and Stockhausen (Graefe's Arch. f. Ophth., LXIX, Hft. 1) state that electric and gas-mantle incandescents show a marked extension of the spectrum into the ultraviolet, true also of Nernst and acetylene lights. The Nernst spectrum is much shorter, however, when a shade is used. With electric arcs, the spectra extend far beyond the visual limit, and the maximum of intensity is near the violet end. Finally, in the mercury vapor lamp, the light is shown to consist principally in the two brilliant bands of the blue-violet, with which is combined a long ultraviolet spectrum. Ultraviolet light is not only invisible but is positively harmful, being irritating to all epithelial structures and also causing a fluorescence in the lens (Shanze).

^a In a forthcoming number of the Bulletin this subject of ultraviolet light will be treated at greater length in the report of a study of the use of colored glass for spectacles.—H. W. S.

Birch-Herschfeld (*Zeitschr. f. Augenh.*, July, 1908), in speaking of the injurious effect of ultraviolet light, reports 5 cases in which working by electric lights caused scotomas for red and green, in addition to strong conjunctival irritation.

The primary colors occur in various sources of light as follows:

	Red.	Green.	Violet.
Abney:			
Sunlight	100	193	228
Skylight	100	256	760
Arc, open	100	203	250

Ives (*Trans. Ill. Eng. Soc.*, Oct., 1908, Oct., 1909) gives somewhat different figures. He takes "ordinary" light, determines the contained amounts of the primary colors and arbitrarily accepts each amount as 100 for purposes of comparison.

	Red.	Green.	Blue.
"Ordinary" light	100	100.0	100.0
Afternoon daylight	100	91.0	56.0
Tungsten, 1½ w	100	55.0	12.1
Nernst	100	51.5	11.3
Gem. 2.5 w	100	48.0	8.8
Carbon, 3.1 w	100	45.0	7.4

The colors of certain sources of light may roughly be described as follows:

Carbon filament	Yellowish white.
Gem	Nearly white, slightly yellow.
Tantalum	Nearly white.
Nernst	Very nearly white.
Tungsten	Very nearly white.

The color producing the sense of greatest luminosity varies greatly with the amount of light. Yellow, which is of maximum brightness under ordinary illumination, is succeeded by green, and then by blue, as the amount of light progressively diminishes. It is well known that the perception of blue remains at night long after the sense of green and red is lost, and in the morning the return of color perception is in the inverse order. We may speak here of an effect, not necessarily related to the sense of luminosity, which light produces on the nerves concerned in vision. This sensation, as interpreted by our consciousness, leads us to describe light as hard, cold, mellow, or ambient. This quality, analogous to timbre in sound, is perhaps chiefly due to color, although it is modified somewhat by diffusion, and, in our opinion, greatly by the presence or absence of invisible rays from the blue end of the spectrum.

Since the eye has been evolved under "natural" light, it might be assumed that such light would be best for artificial illumination. However, a difficulty at once presents itself when we attempt to approximate "natural" light. Sunlight has a fairly constant composition. But daylight, being entirely reflected light, is given a composition depending on the relative amounts of the spectrum colors reflected by the dust, moisture, etc., present in the air. In addition, considerable selective absorption and prismatic refraction are accomplished by the atmosphere, so that when the sun is at the zenith a much greater relative amount of blue is present in light from the sky than when the sun is low. Thus "natural" light is a composite of which the constituents occur in constantly varying proportions. The tables below will indicate sufficiently the reality of this difficulty. The whiteness of the light produced by certain illuminants is emphasized by interested persons as being most desirable in that natural conditions are reproduced, but it is to be remembered that, in nature, white surfaces are rarely seen. Even snow is markedly blue, and when we introduce a white paper surface under the eye, we are departing from natural conditions. Hence the assumption of the superiority of "white" light is not necessarily valid. Experience shows us that, while a generous proportion of blue light in any artificial illuminant is essential in order to conserve color values and thus preserve contrasts which are dependent on color, a moderate relative excess of red and green lends "mellowness" and an agreeable character to light.

From what has been said it will be recalled that with reasonable illumination yellow (red plus green) is the brightest color to the eye; that a moderate amount of blue is essential to the preservation of color values, but that the quantity present in average daylight is of little utility by reason of its low visual luminosity, and may, indeed, be harmful when reflected from white paper. Thus, solely from considerations of color suitability, it seems advisable to reject—certainly for the lighting of study rooms—the common arc light having an excess of blue and ultraviolet, the carbon filament incandescent lamp, with its inordinate lack of blue, and the mercury-vapor lamp with its absence of red and orange and excess of ultraviolet.

Incandescent gas mantles are furnished to supply light very nearly approximating daylight, but the use of gas is not seriously considered because it vitiates the air, a mantle of 64 candlepower using oxygen about to the same extent as 12 men (Gatewood); its heat production, too, may be undesirable; it adds to the dangers of fire; it forms explosive mixtures with air; it is a possible agent in accidental asphyxiation, and, in the case of Bancroft Hall, the building is not piped for gas.

(f) *Color of rooms* should be given due weight.—Very light walls add greatly to the effectiveness of most lighting systems, although certain forms of reflectors lower their value in this respect. The color selected should be light, in order to get the maximum value from the current and avoid undue contrast between work and surroundings. It should likewise be as free from dark areas as may be practicable. Smooth paints and papers give a very considerable amount of surface reflection of white light in spite of the pigments with which they may be colored.

The effectiveness of various surfaces may be deduced from the following table, which gives the nature of the surface and the percentage of white light reflected by it:

	Per cent.
White paper	80
Chrome yellow paint	60
Yellow pine	45
Yellow paper	40
Light yellow paint	40
Emerald green paper	18— .08
Blue-green paper	12— .1

No reflecting surface can add to the light it reflects; there is merely the question of how much is absorbed. But while we desire maximum reflection and minimum absorption, which would be conferred by a glossy white surface, this advantage would be outweighed by the glare and the cold, barren aspect of the walls. Several tints recommend themselves as being unobtrusive and agreeable, and also of high reflecting power. In fact, their capacity in the last respect is greater than the table indicates, since the light reflected by them would contain a greater proportion of red and green, the colors for which their reflecting capacity is greatest. The color selected is a light greenish-yellow which, by tungsten light, becomes a pleasing yellowish green. Other similar tints are suitable, but in general we prefer a tint tending to yellow for shady rooms and one tending to green for sunny exposures.

The paint used should be durable, easily cleansable, and have a smooth, dull surface. In order to conserve the fresh appearance of the walls, a dado of darker color, with border, is advised. This may extend to a height of 4 feet if the dimensions of the room permit.

The ceiling should be painted a white, slightly tinted with yellow. This ceiling paint should extend downward about 15 inches to a picture molding, or suitable border, designed to reduce the apparent height of the room. The ceilings in Bancroft Hall are high, and the effect of their vault-like appearance is mitigated by the dado and molding.

Although reflection from walls and ceilings is an important addition to the direct illumination obtained on any surface, as strikingly shown in diagram No. 8, its value is, nevertheless, considerably reduced when we employ shades which markedly increase the downward distribution of light, and, in the end, the principal advantage of a light-colored wall lies in the avoidance of annoying contrasts. Thus we are brought to face the question of how to determine when a contrast is excessive. There will be, as always, a marked individual variation in the sensitiveness of the retina, and also in susceptibility to the production of sensations of pain or fatigue by rapid movements of the iris. Perhaps the best rough test is to stand with one's back to the light wall near the suspected area and by means of a hand mirror flash successive images of the two surfaces into the eye. Each image may be retained several seconds or longer, but let there be no appreciable interval between them so that gradation of stimuli is possible. If no discomfort is caused by this procedure it may be safely assumed that the contrast is not excessive.

The same considerations apply to trim and furniture in the room. They should be of an agreeable light color, although we do not believe it necessary to destroy the beauty of woodwork by paint. Esthetic considerations may well govern.

(g) *Window shades* are important. Without them the sun by day makes painfully bright areas, perhaps where most injurious, and thereby also apparently darkens the rest of the room—in accordance with the law that the more intense the light the darker the shadows—while, by night, the window appears as a black void in the light wall. Curtains should be chosen for adaptiveness to conditions of day and night. Fortunately, the requirements are identical. The shades should not be opaque, but merely of such thickness and texture as thoroughly to diffuse all sunlight, and secure privacy by night. The color selected determines the color of the light transmitted or reflected, and should approximate to that chosen for the walls—the reason for selection having the same basis.

(h) *Desk tops*.—In choosing color and finish, the same considerations hold as apply to other surfaces. The most acceptable color is a light green with a dull finish. The employment of cloth, as with card tables, is prohibited by expense and from considerations of cleanliness.

(i) *Pictures*.—The chief drawback to the arrangement suggested in the above paragraphs is that the plain, light walls have a cold and unattractive aspect quite different from the sense of restful warmth imparted by rich shades of green and red. Whatever be the psychologic reason for this phenomenon, it is common experience that the sense of cheerless spaciousness conveyed by bare,

light walls is hostile to genial contentment and feelings of comfort. The cultivation of the sense of pleasure in one's surroundings, and also the harmonious relation of the individual with his habitation, we regard as being of sufficient importance to merit serious consideration.

We therefore earnestly recommend that the midshipmen be allowed to hang pictures on the walls of their rooms under such supervision as the Superintendent may direct. The only objection to be urged against the adoption of such a course would be the possible accumulation of dust on pictures and moldings, but, in our judgment, this objection is not of signal importance. This course would not only individualize the room, banish the repulsive bareness of the walls and make their attractiveness felt, but would also have a most desirable physiologic effect. Light walls, unrelieved in their plainness, furnish, as we have said, no sense of position, and the eye unconsciously wanders over them in a state of unrest, with its accommodative mechanism fluttering. Pictures afford the eye grateful points of rest.

TYPES OF ILLUMINATION AVAILABLE.

(a) *Indirect*.—An effort to approach natural lighting has been made by employing only reflected light. Of the several systems advocated, some make use of specially designed metallic ceiling reflectors, and others utilize the walls and ceiling. All systems of indirect illumination have certain defects inseparable from the principle involved.

In rooms lighted by this method the work appears insufficiently illuminated. That relatively enormous amounts of illumination are needed for comfortable reading by any indirect system is indicated by the amount of daylight tolerated—a light which is altogether reflected and which is habitually employed in an intensity greatly in excess of that derived from any artificial illuminant. In order to obtain a reasonable degree of comfort, it is estimated that the amount of light on the work must be about 60 per cent greater with the indirect than with other methods. Even so, the result will not be wholly satisfactory. The strong stimulation of the sensitive periphery of the retina by side light from the walls will contract the iris, thus excluding much of the light from the work, and, by comparison also, the work will appear dark, since its image falls on the less sensitive part of the retina. This is repetition (in other words) of the requirement that the area of work be more highly illuminated than the walls. Furthermore, there will be great waste of light unless special reflectors are employed. This loss of light from

absorption by walls, and from aberrant reflection, means that two to five times as much current and primary light will be required to get equally satisfactory illumination of work.

These considerations alone are of sufficient importance to preclude the adoption of this system at the Naval Academy. In addition, there may be mentioned certain faults apart from cost. The color of the light is very apt to be affected by the reflecting surface, especially in systems requiring ceilings. Dust and dirt have an enormous effect in lowering its efficiency, more, probably, than with any other method. The perfect evenness of illumination is not altogether advantageous. Comfort, to repeat, is served by having the work illuminated somewhat more than the surroundings, and the entire absence of all shadows destroys all sense of size, proportion, distance, and texture.

According to Millar, there are four defects inherent in all systems of indirect illumination, cove lighting, skylight effects, or any diffusing surfaces used without directing adjuncts. They are:

1. Loss due to absorption.
2. Loss due to unnecessary intensity at unimportant points.
3. Ineffectiveness of sharply inclined rays.
4. Much higher intensity necessary.

The walls exercise a powerful influence in adapting the eye, and work illuminated to an equal degree appears dark. This is illustrated by the average illumination required for reading, by 10 observers, viz:

Under direct illumination.....	2.7 foot candles.
Under indirect illumination.....	4.45 foot candles.
Difference in percentage of direct.....	165 per cent.

(b) *Direct systems*, in which unprotected lamps hang low in the room, are barbarous. The foci of intense brilliancy are unbearable for more than short periods of time. The apartment is illuminated most unevenly, disturbing shadows and reflections are everywhere present, and in no way can the area of work be made to appear other than dark so long as the insistent points of light are present in the line of vision. Foci of light have been mentioned under the heading of "Glare."

Translucent shades of opal, milk, sand-blasted, or other similar varieties of glass, are useful in diffusing, more or less successfully, points and lines of high intrinsic brilliancy. On the other hand, they do not satisfactorily obscure filaments without disproportionate loss of light by absorption; they do not redirect the rays and distribute them where the greatest illumination is desired. In order to increase the downward distribution of light, they must be combined with some form of reflecting or refracting shades, and, in consequence, further discussion properly falls elsewhere.

Opaque reflectors and semiopaque shades usually give very uneven illumination, although this objection does not apply to them all. They all do, however, cause extreme contrasts of light and shade in the room, a condition which we have mentioned as undesirable.

(c) *Direct, with suitable shades.*—The Holophane (patented) globes and reflectors are unique in that the surface is ribbed by prisms, so that the light is both refracted and reflected, and the reflectors so alter the light distribution that they must be considered an integral part of the light unit. By means of various shapes and arrangements of the prisms almost any distribution of light is obtained, and in this way a greatly increased amount is directed where most desired.

The globes (Holophane Company) are generally constructed with a series of horizontal prisms on their outer surface for redirecting the light rays, and a series of internal prisms which * * * give perfect diffusion. The external prisms * * * are designed to redirect the light rays by reflection and refraction. Holophane glass reflectors (have) * * * an outer surface which is substantially covered with total or double reflecting prisms calculated to reflect light rays back through the body of the glass and out of the open mouth of the reflector.

Where both stalactites and reflectors were installed it was noticed that the light emitted by the stalactites seemed distinctly yellow in comparison. Visual spectroscopic examination showed a marked recession of the visual limit in the blue end of the spectrum, thus confirming the observation that an appreciable alteration of light is really effected by its passage through ground glass and refracting globes. Bourgeois (Arch. d'Opht., Dec., 1908, p. 773) states that most globes shorten the spectrum. Stockhausen goes so far as to recommend the use of glass in shades which is impervious to ultraviolet light.

The globe type has a distribution similar to the extensive type of bell reflectors (see diagrams No. 11 and No. 12). The distribution of the stalactite type is between that of the intensive and extensive types of bell reflectors. We have plotted out the typical distributions obtained with both kinds, and reference is invited to the appendices, where will be found several diagrams illustrating the distribution obtained under the actual conditions of installation.

In the bell or reflector type only the sides of the lamp are inclosed, and a bulb with a frosted bottom is then required. Additional softness and diffusion may be obtained by the use of a "satin finish," or hydrofluoric etching, on the shade. There is then, however, some additional loss of light by absorption and the distribution is less marked. The prisms accomplish their purpose satisfactorily, and we see no reason for using the satin finish where softness of lighting is not the paramount consideration. Enameling is a

special process, and some months are required to make deliveries on goods finished in this way.

The chief objection to the bell type lies in the exposure of the frosted tip. The frosting is insufficient to diffuse the light perfectly, and it exhibits areas of very high intrinsic brilliancy. Owing to irradiation, the narrow filament of a glow lamp swells out into a broad band, of apparent uniform intensity, perhaps ten times the actual width of the filament. Therefore, in estimating intrinsic brilliancy, it is not enough to take the actual width of the filament into consideration. The maximum light intensity which can be borne without bad effect is 4.25 candlepower per square inch. The following table gives the intensity of light, or intrinsic brilliancy, of various sources of artificial light:

Intensity of light per square inch in candlepower:

Incandescent carbon filament.....	300-375
Incandescent with frosted globe.....	2-5
Gem, 2.5 watt.....clear..	625
Tantalum.....do....	750
Tungsten, 1.25 watt.....do....	1,000
Cooper-Hewitt.....	17
Nernst.....	2,200

From this table the necessity for the thorough diffusion of light from a tungsten filament is obvious. Since frosted bulbs do not suffice, unless of sufficient thickness to cause a wasteful absorption of light, a globular prismatic reflector becomes necessary.

The two styles of inclosing prismatic shades are designated "globular" and "stalactite." The globes give a wide distribution and are better adapted to rooms where general illumination is desired. The stalactites give an exceedingly satisfactory distribution [Diagrams Nos. 10 and 12]—one that fulfills all our academic requirements. The efficiency of the inclosing shades, as indicated by the candlepower distribution curves, is less than that of the bell reflectors, but, under the modifying influences of surroundings, the difference in the actual illumination on the plane of work, for the various types, is not as marked as the distribution curves would indicate. The globes accomplish a soft diffusion of light, so that they may be looked at without discomfort, yet the prisms lend a sparkle which adds to the pleasing appearance of the lights. Dust is excluded by an asbestos diaphragm perforated for the socket. This disk serves also to reflect back to the prisms light which otherwise would escape toward the ceiling. The lamps do not appear to become much heated, so that their life is probably not unduly shortened by the complete inclosure.

It might be supposed that a large loss of light by absorption would take place, but such seems not to be the case. The general results of experiments on absorption by globes, performed by several observers, are as follows:

	Per cent.
Clear glass -----	10.0
Holophane (Mass. Inst. Tech.) -----	12.3
Light alabaster -----	15.0
Light sand blast -----	20.0 to 25.0
Opalescent -----	20.0 to 40.0
Ground -----	25.0 to 30.0
Opal -----	25.0 to 60.0
Milky -----	30.0 to 60.0

Inclosing prismatic shades (globes and stalactites), then, are superior to translucent globes or bell shades, not only for reducing to limits of comfort foci of high intrinsic brilliancy, but also for increased transmission of light; and these qualities are joined, especially in the case of the stalactites, to a distributing power not much inferior, for the purpose in view, to that of the bell-shaped reflectors.

(*d*) *Lamps*.—The Westinghouse-Nernst glower lamps furnish a steady light of excellent quality. The light is generated by the incandescence of certain earths, as in the gas mantles. These lamps are obtainable in units of suitable size, and, when inclosed in suitable shades, are efficient and agreeable sources of light. But the cost of installation is somewhat greater than for ordinary bulbs, and the cost and labor of maintenance greater, chiefly because a heating resistance coil is necessary, and their efficiency is a little lower than the tungsten.

Of the lamps which we consider available, namely, carbon, metalized filament (gem), tantalum, and tungsten, the tungsten is, in our opinion, most suitable for use in the large and small study rooms.

The carbon lamp, while cheaper in first cost, is expensive in current consumption and shows a marked falling off in candlepower, especially when allowed to burn beyond 80 per cent of its total life. Its candlepower and life are severely affected by changes in voltage, a 4 per cent increase in voltage shortening the life of the lamp 50 per cent, while the depositing of carbon on the frosted bulb has also a marked effect in reducing the candlepower.

The gem, or metallized filament, lamps, although more economical in current consumption, are subject to the same faults as the carbon lamps, but to a less extent.

Tantalum lamps are still more economical in current consumption than either the carbon or gem lamps, and less variation in life and candlepower with changes in voltage. The variation in candle-

power during their life, although not as marked as in the two types mentioned, is considerable.

Tungsten lamps were used throughout the tests and are, in our opinion, best suited for the conditions existing. Their current consumption is extremely small and their life satisfactory. The variation in candlepower for changes in voltage is less, the voltage throughout their entire life is more nearly constant, and their life is less affected by increase in voltage than is the case with either the carbon, gem, or tantalum lamps. Unfortunately the tungsten filament is easily broken in handling and service, and the lamps should be used only in a vertical position. This defect is overcome by suspending the lamps from the ceiling or brackets, out of reach, with keyless sockets and wall or drop switches.

The following tables show the characteristics of each type of lamps:

Effect of changes in voltage.^a

	Candle- power.	Watts per candle.
	<i>Per cent.</i>	<i>Per cent.</i>
Carbon.....	+30	-15
Metallized (gem).....	-27	-13
Tantalum.....	-22	-11
Tungsten.....	+20	-10

^a Change with 5 per cent increase in voltage above normal.

Power consumption and life.

	Watts per candle.	Useful life.	Fall in candle- power.
		<i>Hours.</i>	<i>Per cent.</i>
Carbon.....	3.1	450	20
Gem.....	2.5	450	20
Tantalum.....	2.0	750	20
Tungsten.....	1.25	1,000	10-15

The useful life of a lamp is considered ended when the candlepower has fallen 20 per cent. The total life may be much longer with a corresponding loss in candlepower. With the tungsten lamp, its entire life is its useful life, as it burns out before the drop in candlepower reaches this figure. This characteristic of the tungsten lamps is important in that it insures a reasonably constant intensity at all times in the source of light.

If we are to concede any value to the absolute standard of foot candles adopted, the importance of securing, as nearly as may be practicable, constant candlepower values for the lamps is apparent.

For the purpose of securing some accurate information as to what extent the deposition of dust on the shades can affect the illumination on the plane of work, a number of photometric readings were made along one axis of the experiment room. Fine dust was then sifted over the shades and thrown at them from various angles. When the shades had accumulated all that they would retain—an amount far in excess of what would be allowed ordinarily to gather—readings were again taken (stalactite shade used).

The change in illumination was:

	Per cent.
At 0.5 foot from center.....	—15
At 2 feet from center.....	—15.5
At 4 feet from center.....	—16
At 6 feet from center.....	—24.5

It is evident that dust may cause a distinct falling off in illumination and that the percentile diminution becomes more marked as we leave the center and approach the walls. We attribute this greater relative loss at the periphery to two factors: First, the light incident in the center of the room comes from prisms which have an obliquity downward, and therefore retain little dust, whereas the light which falls far out comes from prisms of which the superior surfaces are more nearly horizontal and hold considerable dust. Second, the prisms above the equator also are arranged so that dust is readily caught. Since the light which they should pass is made available by reflection from ceiling and walls, it follows that when the transmission of this light from the upper segments of the globe is impaired the quantity of reflected light is diminished and the illumination near the walls is disproportionately lowered.

SUMMARY.

(a) *Requirements.*—We may summarize the foregoing general considerations into certain specific requirements which we have kept in mind in planning the details of the installation:

(1) That at the periphery of a circle 8 feet in diameter the illumination normal to the plane of work shall not be much less than 2 foot candles, gradually increasing to approximately 2.5 foot candles, over the area of the table, with a maximum at the center not to exceed 3 foot candles. The illumination outside of this circle shall decrease uniformly to a minimum of about 1 foot candle at the walls.

(2) That the general illumination on the walls shall be without apparent unevenness and of much less intensity than on the plane of work.

(3) That, so far as practicable, the intensity of the radiating sources of light shall be low and the lamp filament entirely screened.

(4) That the general aspect of the study rooms, which are likewise living rooms, shall be cheerful.

(5) That the window shades shall be adapted to both day and night use; i. e., to diffuse the direct sunlight by day and to screen the occupants by night.

(6) That the expenditure of energy, cost of installation, and maintenance shall not be excessive.

(b) *Experimental work: Description.*—The various arrangement of lamps, shades, and globes was as follows: In the large room, when three lamps were used they were spaced 15 inches center at points of a triangle—the two lights were hung from present drop cords 2 feet 8 inches centers on the diagonal of the table. In the small room, the 1-light fixture was suspended 1 foot to left of the center of the table and halfway between face of bookcase and front edge of table. The position of the lights is shown on diagram No. 2.

Measurements were taken with a Sharpe-Millar portable universal photometer No. 68, which reads directly the actual illumination (direct plus reflected) normal to the plane on which measurements are taken. All readings were made by the same observer. Check readings were taken with the same instrument on a standard comparison lamp and found to be well within the limits of accuracy of the work. Three readings were taken at each point, and in case of a palpable error a fourth, the best three readings being averaged.

Tungsten lamps, 40-watt, were employed throughout, the same individual bulbs being used, as far as practicable, for the various shade combinations. In the large room, for shades E, I, and F, lamps were used with long base, bowl-frosted, type II holder. For stalactites 3354, lamps were short base, clear, regular holder, with asbestos mat over mouth. In the small room, for 1-light position, stalactites 3363 and 3354 and shades I-5 were used with short base, clear lamps, type II holders for the shades, and regular holders with asbestos mat for the stalactites. Long base, bowl-frosted lamp was used with shade F-5, type II holder. With the 2-lamp position, shades were I-5, type II holder, with long base, bowl-frosted lamps.

Lamps were burned thirty to sixty hours before taking measurements. Candlepower measurements were not made for lamps or for the combination of lamps and shades. Lamps in all cases were 110-volt D. C. lamps, regulated at this voltage by rheostat.

In the large room, No. 40, readings on the table plane, 2 feet 6 inches above floor, were taken on two axes—one intersecting door and window, and one at right angles to it. Readings were taken 6 inches from center and thereafter every foot to wall in each direction

and on both axes. Wall readings on plane $6\frac{1}{2}$ inches from wall were taken on one wall only, at north end of axis at right angles to door and window axis, and in vertical plane of this axis. Measurements on table plane were taken with walls colored as at present and after redecorating, and with each arrangement of lights and fixtures used; measurements on vertical axis with walls redecorated only. In the small room, No. 40A, measurements were taken at distributed points on table plane but not on walls; room was not redecorated. In large room the two bookcases were in position; in the small room, the bookcase and wardrobe; no other furniture was in rooms. Although No. 40A is not a study room, it is the same size, and measurements taken there will apply to all small study rooms.

Measurements were taken with the following combinations:

Large room.

Number of lights.	Shades.	Height above table.	40-watt lamps.	Holder.
		<i>Feet.</i>		
3	Extension E-5	5	Long base, frosted	Form H.
3	.....do.....	6	.....do.....	Do.
2	Intensive I-5	5	.....do.....	Do.
2	.....do.....	6	.....do.....	Do.
2	Focusing F-5	7	.....do.....	Do.
2	.....do.....	8	.....do.....	Do.
2	Stalactite globes 3354	5	Short base, clear	Regular, with asbestos mat.
2	.....do.....	6	.....do.....	Do.

Small room.

		<i>Feet.</i>		
1	Stalactite 3363	5	Short base, clear	Regular, with asbestos mat.
1	Stalactite 3354	4	.....do.....	Do.
1	.....do.....	5	.....do.....	Do.
1	Focusing F-5	5	Long base, frosted	Type H.
1	Intensive I-5	5	Short base, clear	Do.
1	.....do.....	6	.....do.....	Do.
2	.....do.....	6	Long base, frosted	Do.

Height above table is distance to bottom of shade or stalactite in all cases.

All shades were "satin finish;" globes and stalactites, clear prismatic glass.

Illumination calculations.—The luminous intensity of a source of light is expressed as so many candlepower as compared with a standard candle. In general, the intensity of any source varies with the direction in which the light is emitted. Incandescent lamps are usually rated in terms of their mean horizontal candlepower. Watts per candle denotes the consumption of the lamps, in watts, per mean horizontal candlepower.

The light distribution about any radiant, including the shade, must be determined photometrically for each combination of shade and lamp and is usually expressed graphically by a polar curve. The position of the filament within the shade materially affects the character of the distribution and, in general for reflectors, the higher the filament is placed in the neck of the shade the greater is the downward candlepower. The combination of lamp, shade, and holder must therefore be exactly as indicated for the distribution curve used.

The illumination on any surface is usually expressed in foot-candles. One foot-candle is the illumination produced on a surface 1 foot distant by a source of 1 candlepower, the rays falling normally to the surface.

The intensity of illumination produced on a surface by a source of light concentrated at a point varies inversely as the square of the distance between the surface and the source of light, the surface being at right angles to the direction of the rays. When the surface is inclined to the direction of the rays the intensity of illumination

$$= \frac{\text{intensity of source}}{\text{square of distance}} \times \cos. i.$$

where i is the angle of incidence of the rays. This law holds practically for sources of considerable size when the distance is large compared with the dimensions of the source.

For any artificial source of light it is evident that the candlepower in the direction from which the light comes must be known. This information is obtained from the distribution curve of the combination of shade and lamp under consideration. The computed values given by the tables and curves are determined in this manner and represent the intensity of illumination normal to the table plane. Such computations do not, of course, take into account reflected light from walls, ceilings, and floors. Reflected light very materially augments the illumination on the plane of work, the increase depending on the size and color of rooms and arrangement of lights. It should be noted that the distribution curves used are for clear shades, while the shades actually used were "satin finish." The photometric measurements of illumination include not only the direct light but reflected light, and represent the total intensity of the normal illumination available on the plane on which measurements were taken.

Results.—An inspection of the following tables and appended diagrams indicates that in room 40, for a height above table of 6 feet, a similar distribution is produced by 2 stalactites 3354, 2 intensive shades I-5, and 2 extensive shades E-5, and that 2 focusing shades F-5 at 8 feet give nearly the same illuminating values. At a height of 5 feet there is considerable variation, the 2 stalactites and 2 ex-

tensive shades being more nearly alike—comparing closely with 2 focusing F-5 at 7 feet. Values for the 2 intensives I-5 at 5 feet are considerably higher.

Measurements with the extensive type of shades were taken only with the 3-light position, but two-thirds of these values will represent closely the results that would have been obtained with the 2-light position. The distribution on the wall is nearly identical for all combinations with the 2-light position.

The illumination with 3 extensives E-5 is entirely too great, not only on the plane of work but on the walls. It should be noted that the actual measurements do not bear out the values computed from the polar candlepower diagrams. It was to be presumed that reflection from walls and ceilings would augment the computed values materially, but the actual results do not show a definite relation. The computed values for the focusing type are much more, and for the extensive type much less, than the actual measurements. This is probably due to the "satin finish" on the reflectors, modifying largely their distributing characteristics. The candlepower diagrams used for the computations were furnished by the Holophane Company and were for clear shades.

In the small room, No. 40A, similar distribution was secured with 1 intensive I-5 at 6 feet, 1 stalactite, 3363 at 5 feet, and 1 focusing F-5 at 5 feet above the table. Short base clear bulbs were used with the intensive and stalactites, and long base frosted with the focusing. The 2 intensives, I-5, with long base frosted bulbs give too much illumination and throw a shadow of the student's head on the table.

(c) *Conclusions and recommendations.*—A study of the experimental results and the general considerations shows:

(1) That redecorating the rooms decreases their apparent height and renders their general aspect more pleasing. The tinting of the ceiling decreases somewhat the illumination over the working area, but this loss in efficiency is not sufficient to warrant the retention of the present dead white surface.

(2) That the 3 lights in the large room with extensive E-5 shades 6 feet above table, and the 2 lights in the small room with intensive I-5 shades 6 feet above the table, give more illumination than is desirable over the working area and undue brightness on the walls.

(3) That a very substantial part of the illumination is due to reflected light from walls and ceilings.

(4) That with all types of bell reflectors, even with frosted bulbs and "satin-finish" shades, the intensity of the source of light is brighter than is desirable.

(5) That the prismatic stalactites, while producing adequate general illumination and satisfactory distribution over the working

area, reduce to a greater degree than any other type the intensity of the source and lend a sparkle and color to the light which is most pleasing.

(6) That 2 stalactites, No. 3354, 6 feet above the table in the large room, and 1 stalactite, No. 3363, 5 feet above the table in the small room, give adequate general illumination and satisfactory distribution over the working area.

(7) That for the conditions of daylight illumination diffusing window shades are a necessity on the sunny sides of the building.

(8) That the hanging of pictures on the walls to relieve the cheerless appearance of the rooms is desirable.

The lighting system recommended consumes no more current than the existing installation and much less than that previously proposed. With the exception of one new fixture in each *small* study room, no new fixtures are required.

The possible swinging of the heavy globes suspended on drop cords is not, in our opinion, of sufficient moment to warrant the expense of new ceiling fixtures.

Watts required per room are as follows:

Large room.

System recommended, 2—40-watt tungsten lamps=80 watts.

Present system, 2—40-watt tantalum lamps=80 watts.

Formerly proposed, 3—40-watt tungsten lamps=120 watts.

Small room.

System recommended, 1—40-watt tungsten lamp=40 watts.

Present system, 1—40-watt tantalum lamp=40 watts.

Formerly proposed, 2—40-watt tungsten lamps=80 watts.

The life of a tungsten lamp in a closed globe, such as the stalactite, may be less than with a bell-shaped reflector which allows a better circulation of air about the lamp. We have not been able to secure any definite information on this subject. By the selection of lamps with a proper voltage to suit the operating conditions it should be possible to secure a life of eight hundred hours. In our opinion the conditions warrant the use of the stalactites in preference to the bell reflectors, even though the life of the lamp may be materially shortened.

We consider that tungsten, 40-watt, short base, clear lamps should be used throughout, with 2 stalactites, No. 3354, 6 feet above the table in the large rooms, and 1 stalactite, No. 3363, 5 feet above the table, in the small rooms. Present cord drops are satisfactory for the large rooms, but new bracket fixtures are necessary for the small

rooms. The illumination secured in the large rooms is 2.4-foot candles at center, 2.2 at 2 feet from center, and 1.6 at periphery of 8-foot circle.

To secure satisfactory illumination in the small rooms is difficult. An open book rack rests on the table, the spaces beneath the shelves being in deep shadow. The student, sitting at the desk in the only position possible, is confronted with this dark area whenever the eye is raised from the brightly illuminated white paper. We fully appreciate how undesirable such conditions are, yet we do not see our way at present to make the extensive changes necessary to remedy the defect. We hope that making the shelves narrower and filling them with books will render the contrast less abrupt. The illumination produced in the small rooms is 1.9-foot candles to 2.6-foot candles on the table, diminishing to 1.7-foot candles at 2 feet from the front edge.

Our recommendations in detail are as follows:

Lamps.—Tungsten lamps, 40-watt, short base, clear, are recommended throughout for all study rooms, both large and small—two for the large rooms and one for the small.

Shades.—All lamps in large and in small study rooms are to be provided with Holophane or equivalent stalactites, No. 3354 for the large rooms and No. 3363 for the small rooms. Asbestos mats are required to close the top of the globe and keep out dirt. These mats should be punched with small holes to provide circulation within the globes.

Fixtures.—In large rooms, use the present cord drops with fixed length of cord, bottom of stalactite to hang 6 feet above table. For the small study rooms, new wall brackets will be required, placed as indicated on diagram No. 2, bottom of stalactite to hang 5 feet above table. Provide keyless sockets on all fixtures in study rooms, with drop switch in large rooms and wall switch in small rooms.

Color of walls.—Dado, light brown, from baseboard to height of about 4 feet above floor, with simple painted scroll at top. Picture molding, about 15 inches below ceiling, painted color of ceiling. Wall, dado to picture molding, a light yellow-green. Ceiling and wall above picture molding, white, slightly tinted with yellow. All paint should be matt surface, oil color.

Trim.—Should be finished as at present. Provide new picture molding, painted color of ceiling.

Table.—Should be finished light-green matt surface. The present color is satisfactory, but surface should be dull. Table should be planed and treated with a green filler before painting.

Window shades.—The present slat shades should be removed from the sunny sides of the building, and throughout if practicable. Provide rolling cloth shades of color similar to that of walls. They should be of the most durable material obtainable, with substantial fixtures.

Pictures.—The hanging of suitable pictures, to relieve the bareness of the rooms, merits serious consideration and is, in our opinion, desirable.

Bookcases in small rooms.—The depth of bookcases should be decreased so that books will project slightly beyond edge of shelves.

Small sleeping rooms. which are not used for study, require no change in the present system of lighting. When these rooms require repainting, the colors recommended for study rooms should be used, the yellow-green extending to ceiling, without picture molding.

APPENDICES.

Diagrams are attached as follows:

No. 1 is part plan of southeast corner of the ground floor, Bancroft Hall, showing typical arrangement of rooms.

No. 2 shows arrangement of rooms, position of lights, points at which measurements were taken, and color scheme for the rooms in which experiments were conducted.

No. 3 shows graphically the normal illumination in large room, No. 40, on table plane and wall, for various arrangements used. Curves are shown for room redecorated and on north and south axis only.

Nos. 4 and 5 show curves of illumination normal to table plane, room No. 40, for room redecorated. Curves are shown as concentric circles, the readings at the same distance out on all four axes being averaged and curves interpolated.

Nos. 6 and 7 show curves of illumination normal to table plane, room No. 40, for original decoration, room redecorated and curves as computed from candlepower distribution diagrams of combined lamp and shade. The diagrams for candlepower distribution were furnished by the Holophane Company, and were made with clear shades. All shades used in the experiments were "satin finish."

No. 8 is a table of intensities of illumination in large room, No. 40, with original decoration, redecorated, and computed values.

No. 9 is a table showing intensities of illumination in small room, No. 40A, with original decoration.

No. 10 shows the candlepower distribution curves as furnished by the Holophane Company for 40-watt, bowl frosted, tungsten lamps, long base, as combined with clear shades E-5, I-5, and F-5.

Curve for stalactite No. 3354 is with 40-watt, short base, clear, tungsten lamp; for stalactite No. 3363 with 20-candlepower Gem lamp, clear.

Nos. 11, 12, and 13 are indicated by legends.

Exterior.

Corridor

Interior Court.

Legend:

- A: Basin
- B: Bed
- C: Book case
- T: Table
- W: Wardrobe
- r: Outlets
- D: Lights
- D-P: Lights pointing down
- U: " " up
- Side Lights 5'-6" above floor

Other labels in plan:

- Office in the 1st Division
- Light Shaft
- 3'-6" from outer wall

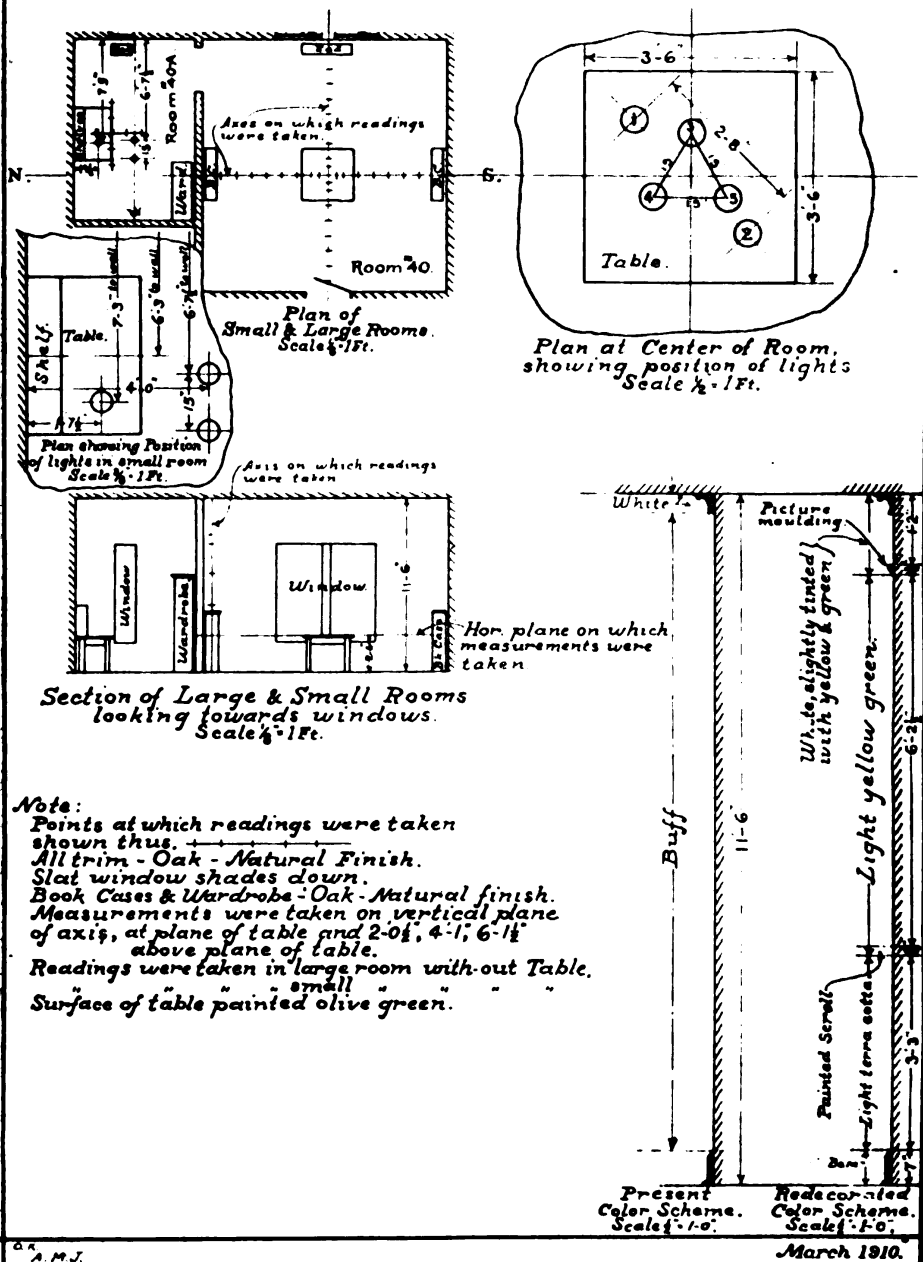
Height of Ceiling on Ground Floor	11'-6"
" " " " First	11'-6 1/2"
" " " " Second	11'-1"
" " " " Third	11'-0 1/2"
" " " " Fourth	10'-5"

Diagram #2.

Arrangement of Rooms, Position of Lights.

Points at which measurements were taken & Color Scheme.

Room #40 Bancroft Hall.

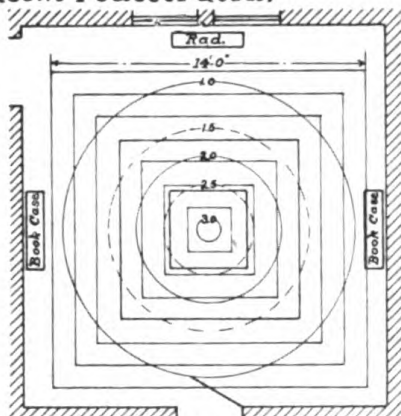


Scale $\frac{1}{2} = 1 \text{ Ft.}$

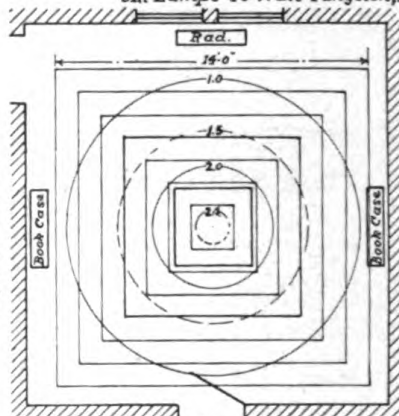


March 1910.

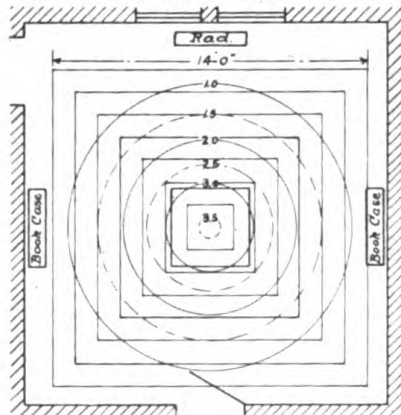
Diagram #4. For Location of Lights see Diagram 2.
Showing Curves of Illumination on table plane in large room
for various arrangements used.
Room redecorated. Scale: $\frac{1}{16}$ " = 1'-0". All Lamps 40-Watt Tungsten, 110 D.C.



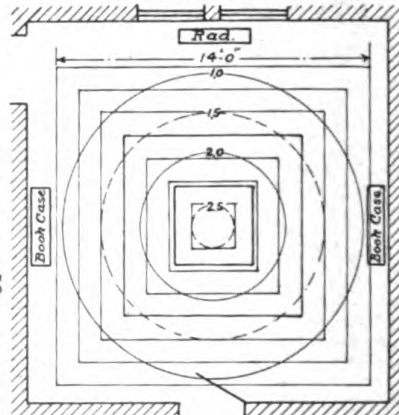
2 Stalactites #3354. 5 Ft. above.



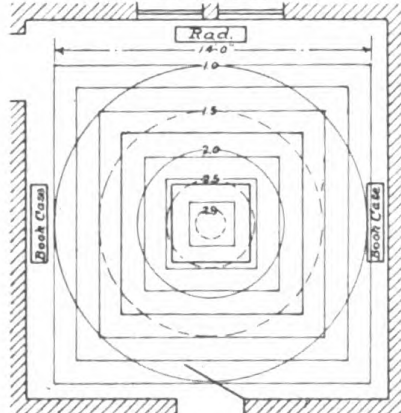
2 Stalactites #3354. 6 Ft. above.



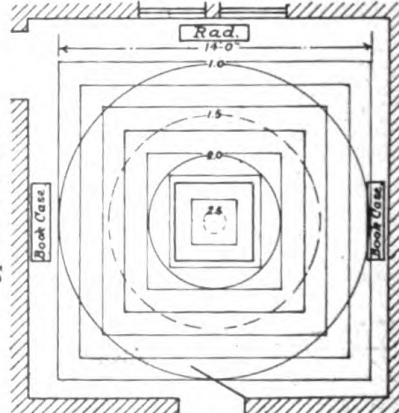
2 I-5. 5 Ft. Above.



2 I-5. 6 Ft. Above.



2 F-5. 7 Ft. Above.



2 F-5. 8 Ft. Above.

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A.M.J.

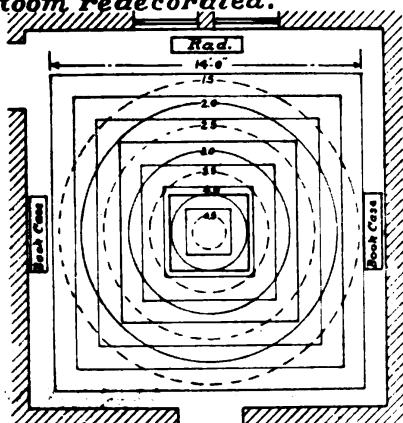
March 1910.

For Location of Lights, See Diagram 2.

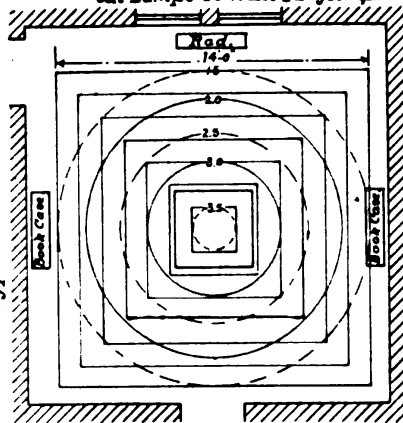
Diagram #5.

Showing Curves of Illumination on table plane in large & small rooms for various arrangements used.

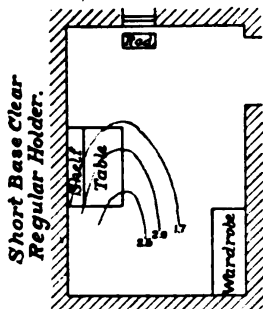
Room redecorated. Scale $\frac{1}{4}$ " = 1 Ft. All Lamps 40-Watt Tungsten 110 D.C.



3-Extensive E-5. 5 Ft. above.

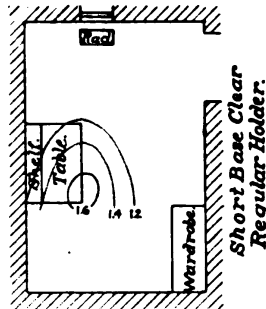


3-Extensive E-5. 6 Ft. above.



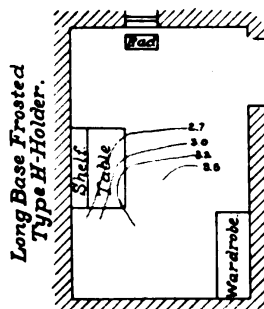
1-Stalactite #3363. 5-Ft. above.

Original Decoration.



1-Stalactite #3354. 5 Ft. above.

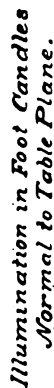
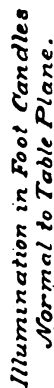
COMBINATION SELECTED.



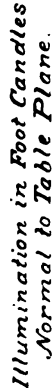
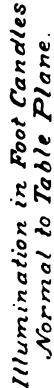
2-Intensives I-5. 6 Ft. above.

N. ————— S.

$\mathcal{N} \leftarrow$ *Diagram 7.* $\rightarrow \mathcal{S}.$



$N \leftarrow$ _____ $\rightarrow S.$



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*Diagram *8.*

*Table of Illumination in Large Room *40
on Table plane and Wall.*

Table plane.

For Location of Lights, see Diagram 2.

Upper Heavy Figures, thus: 2.0 Room Redecorated	} Average Actual Readings on 4 Axes.
Middle Light " " 2.0 " Original Decoration	
Bottom Small " " 2.0 Computed Value.	

← Long base frosted. — ~~Short base cleared~~

Stalactites Regular Holder, all others type H.

Table of Illumination on Vertical Axis

*large Room *40. Room Redecorated.*

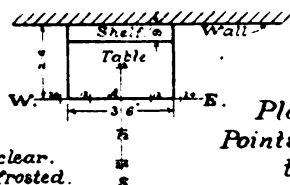
No. of Lamps and
Shades used.

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Diagram *9.
Illumination in Small Room *40A.
On Table Plane

All lamps 40Watt Tungsten,
110-Volts. D.C.



For location of lights,
see Diagram *2.

Stalactiles & 1-Intensive:-Short base clear.
Focusing & 2 Long - frosted.

Plan of table showing
Points at which readings were
taken in Room *40A.

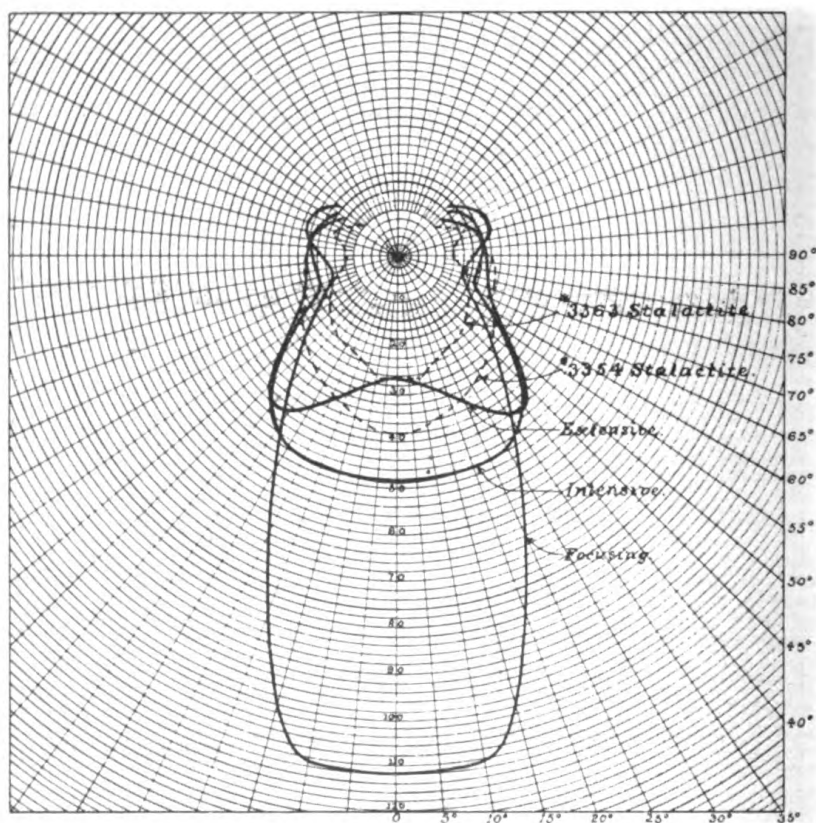
**Illumination Normal to Plane of Table for Systems
used in Small Room *40A. Original Decoration.**

No. of Lamps and Shade used.	Height above table.	Readings in Foot candles.								
		A	12 N.	12 S.	24 S.	12 E.	24 E.	12 W.	24 W.	Average
1-Stalactite *3363	5'-0"	2.4	2.2	2.1	1.7	1.9	1.7	2.6	2.6	2.15
1- " *3354	4'-0"	2.2	2.1	1.7	1.3	1.7	1.3	2.3	2.1	1.8
1- " *3354	5'-0"	1.7	1.6	1.5	1.2	1.4	1.2	1.8	1.6	1.5
1-Focusing F-5.	5'-0"	2.3	2.3	1.9	1.5	1.9	1.5	2.5	2.4	2.04
1-Intensive I-5.	5'-0"	3.3	3.4	2.6	1.9	2.5	1.9	3.7	3.3	2.82
1- " I-5.	6'-0"	2.5	2.5	2.3	1.9	2.3	1.9	2.8	2.8	2.38
2- " I-5(G)	6'-0"	3.2	2.7	3.4	3.5	2.8	2.6	3.3	3.2	3.1

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Diagram*10.
**Characteristic Curves for Focusing, Extensive &
 Intensive Reflectors with 40 Watt long base,
 frosted Tungsten Lamp. Type H-holder.**



Curves of Stalactites *3363 & *3354 not obtainable in March but added in May. Extensive, Intensive & Focusing Shades were E-5, I-5, F-5 with 40 Watt, Long Base, Bowl Frosted, Tungsten Lamps, Form H-Holders.
 *3363 Regular $3\frac{1}{2}$ Holder } Lamps 20 C.P. Gem Clear.
 *3354 " " " " } " 40 Watt, Short Base, Clear Tungsten

Copied from Diagrams furnished
 by Holophane Co.

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DIAGRAM NO. 11.



Extensive type Holophane reflector.



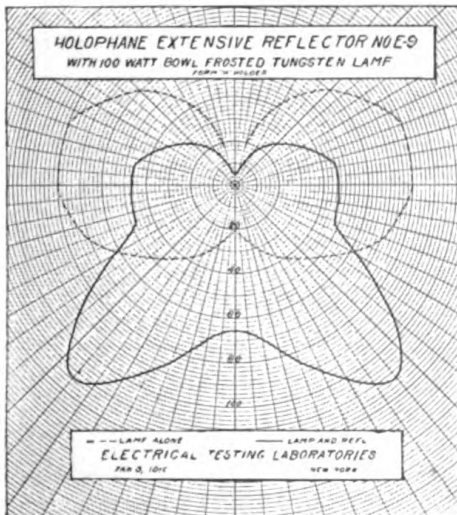
Intensive type Holophane reflector.



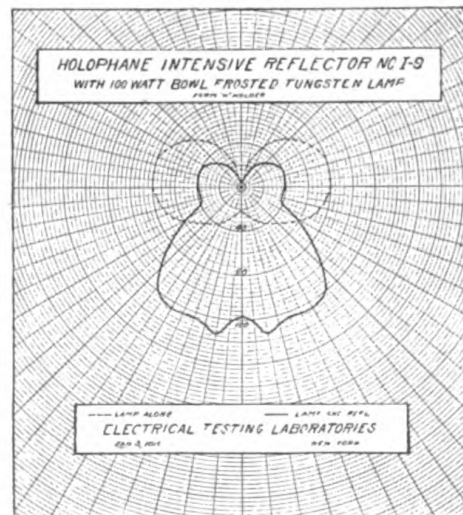
Distribution of extensive reflector.



Distribution of intensive reflector.



Photometric curve of the E-9 size with 100-watt frosted tungsten lamp.



Photometric curve of the I-9 size with 100-watt tungsten lamp.

DIAGRAM NO. 12.



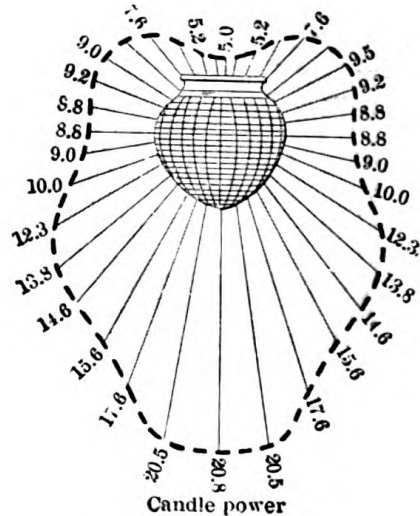
Focusing type Holophane reflector.



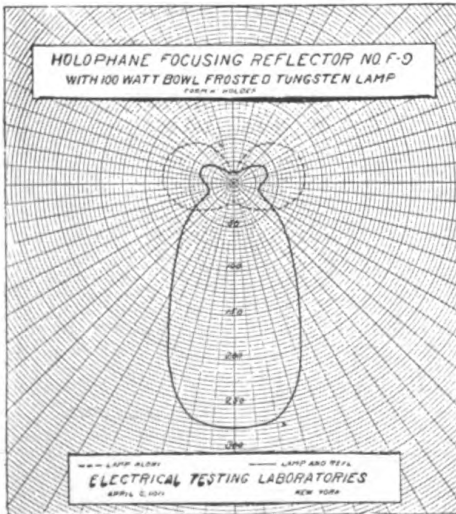
Holophane stalactite globe No. 3363.



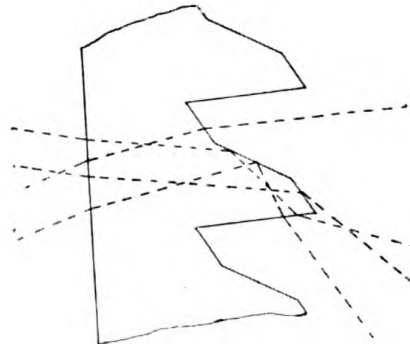
Distribution of focusing reflector.



Curve of Class A stalactite.

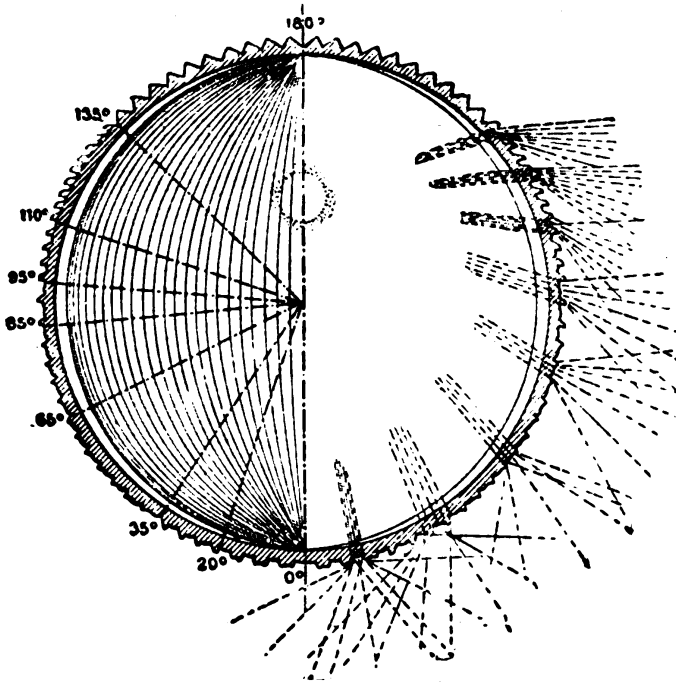


Photometric curve of the F-9 size with 100-watt tungsten lamp.

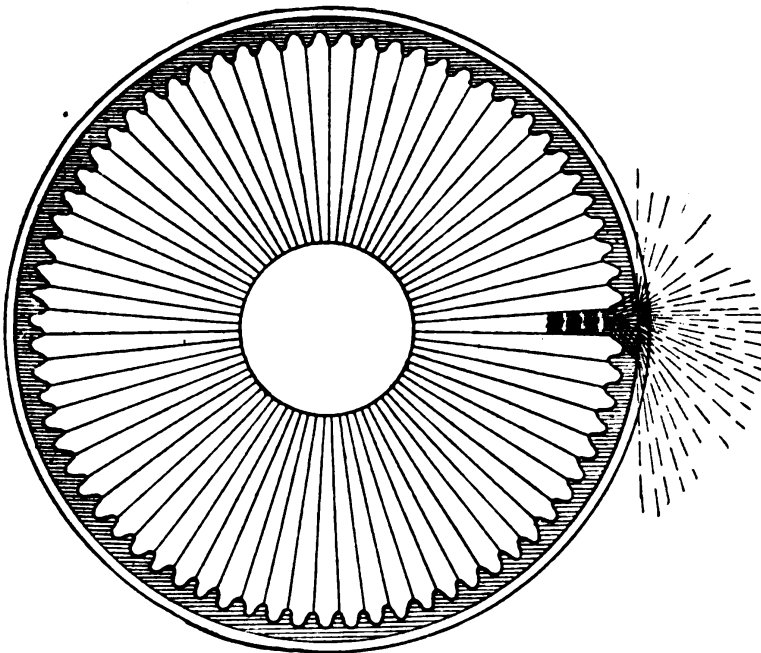


Enlarged view of external prisms showing both refracting and reflecting faces.

DIAGRAM #13.



Vertical section of prismatic globe showing method of redirecting the rays of light.



Cross section, looking at top of prismatic globe, showing internal prisms breaking up the light rays.

THE SURGICAL ASPECTS OF FILARIASIS.^a

By Surgeon-General C. F. STOKES, U. S. Navy.

When your president honored me with an invitation to present a paper he suggested that I select as a theme some feature of tropical service which might be of interest to you. Although until quite recently the manifestations of filariasis were little known beyond latitudes 35° north and south, with a rapidly growing commercial and military association with our tropical possessions, these cases will sooner or later come before you.

When it is realized that 50 per cent of the inhabitants of some of our island possessions are the carriers of these filarial worms, the widespread extent of the affection will be appreciated. By no means all of those infected present clinical symptoms or are even conscious of the existence of these parasites in their blood. It is only when their presence induces pathological changes that symptoms present themselves. It is not enough to demonstrate the presence of the *filaria sanguinis hominis*, but its species must be identified in order that its clinical significance can be appreciated.

Three species of *filaria* will be briefly described, although but one of them, *filaria sanguinis hominis* Bancrofti, so far as known at present, is identified in a casual way with the filarial diseases. By reason of the so-called "filarial periodicity" the embryos of these three worms are easily identified aside from their other characteristics. They are the nocturna (Bancrofti), diurna (*Loa*), and perstans, respectively.

The embryos of the *filaria loa*, or diurna, appear in the peripheral circulation at 8 o'clock in the morning, are most abundant at noon, and disappear about 1 p. m. The embryos are very like the nocturna except the periodicity. The life history of this worm is not known. While it is not absolutely established, evidence shows that the *filaria loa* is the adult form of the diurna. This organism is only found on the west coast of Africa. Clinically the adult forms are sometimes detected on the eyelids or conjunctiva, at other times in the subcutaneous tissues of the extremities, causing the so-called "Calabar" swellings, which are raised œdematous patches, inducing itching and irritation, lasting several days and finally disappearing. The treatment is by excision, which the African natives accomplish with thorns. The intermediate host is unknown. The Mangrove fly and certain species of mosquitoes are, however, suspected. Practically 100 per cent of the white population who remain two years in the upper Kongo become infected.

The adult forms of the *filaria perstans* are found in groups in the connective tissues and fat of the mesentery and in the pericardial

^a Read before the Society of Alumni of Bellevue Hospital, New York, March 2, 1910.

and retroperitoneal aortic fat. Its immediate host is unknown. These worms are found in tropical Africa and Demerara. The embryos of the perstans differ from those of the nocturna and diurna in that they exist in the peripheral circulation at all times, and, too, they are not muzzled, so to speak, by an inclosing sheath and can penetrate the blood vessels' walls with impunity.

In the *filaria nocturna Bancrofti* we have the organism which has to do with filarial diseases, and a somewhat detailed description of the adult and embryo forms of this blood worm will be of interest.

As already noted in the vast majority of cases, the presence of the *filaria nocturna* gives rise to no symptoms whatever, but in some instances this harmony is somehow interrupted and then crippling, disabling, and even grave disease may accrue. The red blood corpuscles are but little affected, while the leucocytes show a disproportionate increase in eosinophiles. In one case with a leucocyte count of 23,000 per c. mm., the percentage of eosinophiles rose to 22. The eosinophiles show a cyclical course following the presence of the embryos in the peripheral circulation. In one case the eosinophilia varied from 8 to 22 per cent; in another, with a leucocyte count of 10,000, the daily variation was from 3 to 15 per cent.

Even the lay visitor to the Tropics is struck by the large number of crippled and disfigured individuals who are the victims of elephantiasis arabum, while those of us who have served in tropical hospitals are impressed with the great prevalence of other forms of filariasis, such as chyluria, varicose groin-glands, lymph-scrotum, chylocele, certain varieties of lymphorrhagia, orchitis, endemic lymph-angitis, and varieties of cellulitis, all depending on a varicose condition of the lymphatics attributable to the *filaria nocturna*.

The adult or parental forms of *filaria* were first discovered by Bancroft, of Brisbane, in 1876. They live in the lymphatics of the trunk and extremities, the sexes being found in association.

In our everyday laboratory studies of these cases we are prone to lose sight of the existence of these adult forms, for we seek out the embryos in the peripheral blood to confirm our clinical diagnosis. The presence of the adult forms in the lymphatic glands was very forcibly brought home to the writer while removing a tumor from the right groin of a Porto Rican who had been the subject of severe elephantoid febrile attacks. A mass the size of a small orange was dissected out and divided at the side of the operating table by an assistant, the cut surfaces presenting a grayish, mealy appearance. The specimen was set aside for future study. As the operation proceeded the anesthetist, a hospital-corps man, startled those present by calling out that the tumor was alive. Sure enough, the cut surfaces seemed to be in motion, and here and there long white hair-like bodies were seen to protrude themselves and slowly coil up. The substance

of the mass was largely made up of these adult worms. This experience appears to be quite unique and not duplicated in the literature.

These adult worms are from $2\frac{1}{2}$ to $3\frac{1}{2}$ inches in length and about the diameter of a horsehair; in fact, they closely resemble white horsehairs. Without going into a full description of these worms it is of interest to know that the embryos in their development in the uterine cavity of the female so stretch and elongate the vitelline membrane that it becomes their characteristic inclosing sheath when they are finally extruded into the lymph stream. In this connection it is worthy of note that attacks of elephantoid fever and other complications are said to be due to the dislodgment by traumatism of ova not fully developed which, by reason of their bulk, lodge in the lymphatic glands and there cause trouble. These febrile attacks clinically can be traced to traumatism in many cases.

The embryo forms, first discovered by Demarquay in 1863, which are found in the blood stream, are the diameter of a red cell and about 40 times as long; they are transparent and colorless, actively motile, possessing a thrashing movement, coiling and uncoiling with snake-like motions, causing great displacement of the red cells. The embryo has a sharp tail-like extremity and a rounded head with an ill-defined six-lipped armature best seen when the motility of the parasite has about ceased. The embryo worm is inclosed in a loose transparent sheath somewhat longer than the worm but generally conforming in shape to its body, which prevents the worm from penetrating the vessel walls.

If the peripheral blood of the human host be examined at the proper time, say at about midnight, from 300 to 400 of these embryos may be found in a single drop. We do not know why this periodic disappearance from the circulation takes place, but it has been found that the *filaria nocturna* can be converted into a day parasite, in its peripheral appearance, by changing the sleeping habits of the host from night to day. In the case of the *filaria diurna* a change of sleeping habits has no effect on its peripheral presence.

Assuming that the *filaria* are evenly distributed throughout the blood, it is estimated that we may have as many as from 40,000,000 to 50,000,000 of these worms in an average sized man giving no more symptoms than the corpuscles themselves.

To follow the life history of the embryo *filaria* in detail in its intermediate host, the mosquito, would lead us too far from the subject; suffice it to say that every stage of this wonderful extrahuman existence of the parasite is perfectly demonstrable in the mosquito from the time of its abstraction from the human blood to its reintroduction to man at the instant of the insect's bite, when it finds its way again into the lymphatic trunks undergoing sexual mating and

reproduction with the embryos passing into the blood stream while the parent filariæ male and female remain fixed in the lymphatic trunks. The particular variety of mosquito concerned in filarial distribution is *Culex fatigans*, an extremely common variety in most tropical countries.

The clinical manifestations of filariasis have been grouped by Manson under two heads—"Elephantoid diseases" and "Elephantiasis."

Chyluria, one of the so-called elephantoid diseases, while at times extremely debilitating and disabling, is seldom fatal. Connected as it usually is with the presence of adult worms in the thoracic duct, it is liable at any time to be complicated by serious conditions arising out of the death of one or more of these parasites, which may be followed by septic infection in a locality that can not be satisfactorily approached surgically.

Some years ago, while I was serving as surgeon of the battle ship *Oregon*, in Japanese waters, a fireman who had been under treatment at our naval hospitals in the Philippines and in Japan for a supposed heart lesion, was sent to us for service. After standing one four-hour watch, he reported that he was unfit for duty. A careful examination brought to light no abnormality of his organs; his temperature and pulse were normal, but his respirations were 55 per minute. He was fairly well nourished, though somewhat anæmic. In accordance with the writer's routine practice on board ship, a specimen of his urine was saved and found to be chylous with a tinge of blood. That night the *filaria nocturna* was demonstrated in his blood and later he was returned to the hospital with a diagnosis of filariasis. It is known that the filarial embryos accumulate in the blood vessels of the lungs and heart during the day and that the thoracic duct is often involved in these cases, still the writer was unable to account for this disabling rapidity of respiration which persisted day and night while the case was under his observation.

Varicose inguinal glands are a very common result of the presence of the *filaria nocturna* in the lymphatics. Both groins may be involved though one side is usually more pronouncedly affected than the other; it is rare for one side alone to be involved. These tumors, as a rule, appear between the ages of 13 and 20 years, and are apt to disappear between the ages of 30 and 50. From time to time they may be the seat of periadenitis, and they then become painful, otherwise they cause little inconvenience. The axillary glands have been involved in rare instances.

Lymph scrotum, like chyluria and varicose inguinal glands, is an indication of the presence of *filaria nocturna* at one time or another. The scrotum may be moderately or extensively enlarged and be covered with herpetic-like vesicles and varicosities of variable sizes.

There are inflammatory and febrile attacks occurring from time to time, attended with lymphorrhagia. It frequently coexists with varicose inguinal glands and chyluria. In a few instances the surgical removal of the scrotum has been followed by chyluria and occasionally by elephantiasis of the leg.

Chylocele.—While serving in the Tropics one is amazed at the number of scrotal lesions he is called upon to treat. Hydrocele is extremely and disproportionately common and is without doubt of filarial origin. In chylocele the tunica vaginalis is distended with a milky or reddish fluid similar to that found in the varicose inguinal glands and in lymph-scrotum. *Filaria* embryos are present and may also be detected in the blood.

In Samoa the writer's experience has been that at the outset of elephantiasis of the scrotum an acute chylocele was the forerunner of the growth of the mass, as shown by the crude efforts of the natives to remedy the condition. In every one of the many cases the writer has operated upon there were evidences of an attempt on the part of the natives to remedy the condition by an incision with glass which has been followed by infection, involving and destroying the testicle on one side.

The various chylous dropsies involving the peritoneum and pleura, the chylous diarrheas and various forms of cutaneous lymphorrhagia and circumscribed inflammation, or thickening of lymphatics, reported from time to time, were no doubt in many instances manifestations of filariasis.

Elephantiasis arabum.—This disabling and disfiguring filarial affection is extremely common in the Tropics, especially so in our South Pacific Islands, the Samoan Group, where from 20 to 30 per cent of the natives present evidences of the disease. Davies in Samoa collected 56 slides from the night blood of 56 cases of elephantiasis and elephantoid diseases and found *filaria* in 27 of his mounts. It is an interesting fact that the embryo worms can not be demonstrated in the peripheral circulation in the great majority of cases of elephantiasis arabum. Manson's explanation is that the adult worms live in the lymphatic trunks of the extremities and that either they or their ova finally occlude the lymphatic glands and that the adult worms die after inaugurating a pathological condition which ultimately leads to the gross manifestations of elephantiasis, and in consequence naturally the embryos can not be found in the blood stream.

Elephantiasis begins with an attack of lymphangitis and an erysipelatous-like involvement of the skin, attended with severe constitutional symptoms. There is usually a sharp and prolonged chill, followed by high fever; terminating after a day or two in a sweat and often in a lymphous weeping of the involved skin. Some of the products of inflammation remain in the tissues, and with febrile attacks

recurring at intervals of weeks or months, the tissues, after a time, grow enormously and become permanently and densely hypertrophied. So dense does this tissue become that the writer has dulled a half dozen knives in the ablation of a moderate-sized scrotum. The skin becomes rough and tuberoso, warty or atrophied. When the leg is involved the process does not commonly extend above the knee. The lesion may end abruptly or fade off into normal tissue.

It is found on incising tissues affected with elephantiasis that the skin and the superficial layers of the subcutaneous areolar tissues are dense, white, and enormously thickened even to the extent of from 1 to 2 inches in the scrotum. The deeper part of the superficial fascia is transformed into a yellowish blubbery-looking mass containing large veins and distended lymphatics from which on section gush blood, chylous fluid, or serum.

Elephantiasis affects various regions of the body, the commonest sites being the legs or scrotum, or both, still the disease may involve the arms, breasts, female genitals, or scalp.

When the scrotum is involved the average weight of the tumor is from 10 to 30 pounds; the writer has removed a mass weighing 60 pounds. It is not difficult to realize the disabling effects of these huge growths.

All of the filarial lesions are attended at one time or another by the so-called elephantoid fever. These febrile attacks are peculiar in that they are characterized by profound mental depression, with suicidal tendencies in some cases. The subjects live in constant dread of the development of elephantiasis. This was exemplified in the person of one of the leading financiers of one of our island possessions. In this case the febrile attacks were in themselves severe and prostrating, and were usually attended with a lymphangitis and some swelling in the left groin, yet these conditions soon disappeared, while a state of profound mental depression and apprehension persisted for a long time afterwards. This patient has been under observation four years and is still free from elephantiasis.

A half-caste native came to the writer in his first febrile attack and presented for examination a hot, swollen, boggy forearm, which later developed into a characteristic lesion of elephantiasis in spite of efforts to check the advance of the disease. Profound mental depression characterized this case as well.

The diagnosis of these conditions is as a rule extremely simple.

In the treatment of filariasis prophylaxis holds the first place. There is no known means of killing the filarial worms when once they have gained a foothold. Every one in the Tropics should sleep under mosquito netting, particularly those infected. Mosquitoes should be destroyed as far as possible. The carriers of filarial worms should avoid all forms of traumatism, particularly those which might cause

the parent filariæ to abort, or which might cause rupture or set up lymphangitis in congested lymphatic areas.

Rossiter, of the United States Navy, who has extensively employed tincture of the chloride of iron in the treatment of elephantiasis, after the method of Du Broglie, of the French colonial service, says:

I also consider it wholly within the range of probability that the widespread administration of this drug to the entire population in endemic areas might eventually eradicate the disease.

Chyluria is best treated on mechanical principles, aiming by rest in bed to reduce the pressure within the vessels of the renal or vesical lymphatic varix and, too, by a restriction of foods likely to increase chyle. After the subsidence of the chyluria a single tumbler full of milk will give ocular proof of the patency or closure of the varix.

Varicose inguinal glands should as a rule be let alone, and the same may be said of *lymph-scrotum*, except when passing into pronounced elephantiasis, when it should be excised.

Chylocele should be treated precisely as we treat hydrocele.

Elephantiasis.—The indications in elephantiasis of the scrotum are plain; the mass should be removed. The writer first dissected out both testes, and as already noted invariably found one destroyed, which he removed. The presence or absence of a complicating hernia was next determined, after which the mass was boldly ablated, safeguarding, of course, the penis and planning for its subsequent covering when necessary. The results were very satisfactory.

In dealing with elephantiasis of the extremities, many ingenious methods of treatment have been employed in the past without success. It is only quite recently that promise of success, even though partial, can be held out. Handley, of the Middlesex Hospital, buries silk threads in the tissues, aiming to establish new lymph channels, and reports encouraging results. This method was employed by Draudt, of Lexer's clinic, in a case of elephantiasis of the thigh, and a decrease of 12 inches in circumference took place in eight days, with a continued steady decrease at the last report ten weeks later.

Rossiter gives 30 drops of the tincture of the chloride of iron three times a day, and in the Naval Medical Bulletin reports on the results of treatment as follows:

I therefore conclude, as a result of these experiments, that tincture of the chloride of iron has a marked effect on the elephantoid process, decreasing the size of the affected parts and restoring function to an even greater degree: that its most marked effect, however, is on the attacks of elephantoid fever, these attacks being markedly lessened in severity, the interval between attacks being very greatly lengthened and in several of the cases cited the attacks have apparently ceased.

VENEREAL PROPHYLAXIS ON THE ASIATIC STATION.

Medical Inspector OLIVER DIEHL, U. S. Navy.

During recent years medical literature has indicated a universal and increasing interest of the medical profession in the etiology and prophylaxis of disease. Current periodicals are filled with reports of investigations and researches, and this work is reflected in the lay world by the institution of public exhibits, by publications, and other means of popular education along these lines.

Medical officers of the navy, from the very nature of their field of practice, have always been foremost in the recognition of the importance of preventive medicine and have been especially taught to combat and prevent the spread of contagious and infectious diseases. They have not been blind to the great strides made by the profession generally in this direction and some have contributed to this advance.

Yet, in spite of these facts, there has been, until comparatively recently, a remarkable indifference to the existence of a class of diseases which, directly or remotely, exceed all others in frequency and in disastrous effects upon service efficiency. They were for years regarded as an unavoidable evil. Cases of gonorrhea were frequently unrecorded, their existence unknown to the medical officer, and their treatment assumed by or delegated to the hospital steward. But in view of the established possibility of their almost entire prevention, venereal diseases may now justly be regarded as the opprobrium of our medical service.

To the German medical officers is due the credit of first instituting a systematic plan for the prevention of venereal disease in a naval service and it has been successfully used for a number of years. About five years ago, while serving on the Asiatic Station, the writer had his attention called to their method of treatment, and at the suggestion of the (at that time) squadron commander made a report to the department, recommended its adoption in our service, and incorporated this same report and recommendation in his annual sanitary report.

Since then some of our medical officers have individually adopted the treatment and there has been an increasing general interest in the matter, but until recently no general attempt in this direction was made and no systematic record of results kept.

About a year ago, upon arriving upon this station as fleet surgeon of the Third Squadron, United States Pacific Fleet, the writer was gratified to learn that a short time previously systematic efforts in this direction had been initiated. It appears that while inspecting one of the ships under his command, the squadron commander, Rear-Admiral G. B. Harber, U. S. Navy, found that Surgeon Jacob Stepp, U. S. Navy, was having much success with prophylactic treatment,

and at once authorized and encouraged its general adoption on the station. Commanding officers gave their hearty cooperation, medical officers all eagerly took advantage of the opportunity, and a systematic scheme of prophylaxis was soon under way.

Recognizing the value of a complete record of the results of treatment, the writer obtained permission to issue a form of monthly report, from which the statistical portion of this article has been compiled. This form is here reproduced.

Monthly report on prophylactic treatment.

U. S. S. _____,
Month of _____, 19—.

		Number.	Percentage.
Men who went on liberty..	Reported upon return		
	Failed to report.....		
Reported upon return.....	Admitted exposure		
	Denied exposure.....		

Veneral diseases.

		Number.			Per-centage.
Total number of cases		Gon.	Chanc.	Syph.	
Probable causes..	Failure to report.....				
	Denial of exposure.....				
	Overstaying liberty.....				
	Extended liberty				
	Failure of treatment.....				

Remarks :

Respectfully submitted.

Commander Third Squadron.

As will be shown, it furnishes data which are not only of medical, but also of ethical and economic interest. It is, however, incomplete and somewhat vague, and will be replaced by the issue of a new one modeled somewhat upon one recently issued for use in the first and second squadrons of the Pacific Fleet, where the scheme has been recently adopted.

The method of treatment in use on this station is as follows: Immediately after return from liberty, the men who admit exposure are required to wash the parts thoroughly with pledgets of cotton, previously soaked in a 1 to 1,000 solution of bichloride of mercury, inject 4 cc. of a 2 per cent solution of protargol into the urethra, and rub a 40 per cent calomel ointment, preferably made up with lanolin, thoroughly into the parts, allowing it to remain. This treatment is carried out under the supervision of one or more hospital apprentices, generally in the sick bay, but in some ships in the "head" or other place especially set apart for this purpose. In this connection it may be well to say that should this scheme be generally adopted in the service, and treatment continued to be carried out on board ship, it will be necessary to provide an especial place, properly fitted up, which will ultimately become as important as the isolation ward or even the operating room, since privacy, removal of possibility of infection, and noninterference with the sick are important desiderata.

The practical application of this scheme of prophylaxis has been gradually developed, and is the following: A copy of every liberty list, which as a rule does not contain the names of chief petty officers who are excused from reporting, is sent to the sick bay. Upon returning from liberty the men are ordered by the officer of the deck to report at the sick bay or place set apart for this purpose. As they report they are asked whether or not they were exposed, and their reply "yes" or "no" is entered opposite their name. Latterly, as the fact of their reporting has, in some instances, been in question, they have been required on board the *Charleston* to place their initials after this entry, the absence of initials indicating positively that they failed to report. On board ships having small liberty parties this precaution is, however, scarcely necessary.

When admitting exposure they are directed to take treatment, and the fact that they complied is also noted. When denying exposure their statement is accepted and they are dismissed. After every one has had an opportunity to report the list is compared with the ship's liberty book, and the names of those who did not go on liberty are stricken off. The names of those who failed to report are placed on the restricted list, and they are required to report daily at the sick bay for three or more weeks for observation. If at the end of that time they do not develop disease their restriction is removed, unless continued as a punishment for violation of the order to report. If, however, they develop disease as a result of not reporting, they are liable to more severe disciplinary measures.

When men report with venereal disease they are restricted until cured. Each case is investigated with reference to the probable cause. The liberty lists on file are referred to, the dates of liberty, the state-

ment of the man as to exposure and facts as to treatment are ascertained. If it is found that the man has denied exposure he is reported for falsehood. If not due to this cause, the fact whether treatment failed on account of being delayed, through overstaying or extended liberty, or on account of inefficiency in application, is, if possible, determined and noted. (Cases of "delayed treatment," i. e., treatment more than twelve hours after exposure, have heretofore been included with cases of "extended liberty," but on the new form, already referred to, they will form a separate class.) When it is shown that the probable cause was "failure of treatment," pure and simple, and that treatment was taken within the prescribed time (twelve hours) after exposure, inquiry is made into the particular case and an effort made to ascertain the reason and rectify any possible future defects. Cases of concealment of venereal disease are already provided for by Navy Regulations, and when such cases are discovered the fact is reported. All the data are kept on file and are used to make up the monthly report to the squadron commander. From these monthly reports the fleet surgeon compiles a monthly summary for the information of the squadron commander, and when the number of venereal cases or percentages of "failure of treatment" appear excessive, attention is invited to the fact with such suggestions as may be indicated. Copies of these monthly summaries are sent to the medical officers interested, which tends to maintain interest in the scheme and the exercise of care in treatment.

At first sight all this detail would seem to involve an immense amount of work. But a year's experience has demonstrated its entire practicability. The crew can soon be taught that reporting upon return from liberty is imperative and that falsehood and concealment of disease are serious offenses. After the scheme is once thoroughly systematized a competent hospital steward can readily supervise the work and keep the records, and supervision of the details of treatment can be safely intrusted to the hospital apprentices.

The cooperation and support of the commanding officer are, however, absolutely essential. Severe disciplinary action will soon reduce the percentage of those who fail to report, deny exposure, or conceal disease.

When the scheme was first started it was found that some men were deterred from reporting through modesty, unwillingness to admit exposure, or, on account of a misunderstanding of the purpose of the order, fear of punishment. But the intent and purpose was fully explained to the crew in the talks on personal hygiene, which are regularly given by the medical officers of the *Charleston* and which are a useful adjunct to the scheme. The men are informed that the plan is intended to save them from the consequences of unclean exposure, that they will be punished only upon failure to comply with the order; an attempt is made to impress them with the

fact that sexual intercourse is not necessary for the maintenance of health, an appeal is made to their manliness and an effort made to arouse and stimulate their moral sense.

Some circumstances which have interfered with the efficacy of treatment are the following: Large liberty parties and their return at unusual hours. Men returning from liberty, especially at night, are unwilling to stand in line and await their turn, are apt to be noisy and disturb the sick and those already turned in, and the treatment is apt to be perfunctorily and carelessly carried out. But with the universal adoption of a prophylactic scheme these details can be arranged so that the difficulties will be reduced to a minimum and the great benefit obtained will more than compensate for any temporary annoyance and inconvenience. In men who return intoxicated the treatment is apt to be omitted or inefficient. These men should, however, not be exempt, but be brought for treatment by the master-at-arms.

The practical working of the scheme of venereal prophylaxis in use on the Asiatic station having now been given in detail, the following report will show the results obtained. It is, however, necessary to state that the scheme was not in use in all the ships from the very first, those happening to be on detached duty falling into line as soon as they became aware of its adoption, and stations on shore have adopted it only recently. At the latter no liberty list is made out. Men go and come at irregular times, and checkage similar to that on board ship is impracticable. Men are, however, ordered to report for treatment after exposure, and if they develop disease it can readily be ascertained whether or not they took treatment. In the total number of men reported as going on liberty only those on shore stations who reported for treatment are included. Nor does this report include readmissions for recurrence of disease, for sequelæ, nor on account of transfers. The cases reported were all primary admissions, the disease having developed within the period covered by the report, and are classified as cases of gonorrhea, chancroid, or syphilis.

Total number who went on liberty.....	70,954
Number who reported upon return from liberty.....	65,635 or 92.5 per cent.
Number who failed to report upon return from liberty..	5,319 or 7.5 per cent.
Number who admitted exposure and received treatment..	21,163 or 32.2 per cent.
Number who denied exposure.....	44,469 or 67.7 per cent.
Total number of primary venereal admissions during 1909 -(gonorrhea, chancroid, or syphilis).....	599
Percentage (based upon number going on liberty) .....	.84

Total number of cases (599) classified, with reference to probable cause:

Failure to report.....	113 or 18.86 per cent.
Denial of exposure.....	85 or 14.19 per cent.
Overstaying liberty	85 or 14.19 per cent.
Extended liberty.....	140 or 23.37 per cent.
Failure of treatment.....	176 or 29.38 per cent.

Failure of treatment (based upon total number admitting exposure), eighty-three hundredths per cent.

The above covers the entire year of 1909. During the last six months the cases have been further classified as follows: Total number of cases during this period, 373; viz. gonorrhea, 246; chaneroid, 108; syphilis, 19; subdivided, with reference to cause, as follows:

Failure to report (gon. 48, chan. 13, syph. 5)	66
Denial of exposure (gon. 23, chan. 17, syph. 3)	43
Overstaying liberty (gon. 33, chan. 10)	43
Extended liberty (gon. 70, chan. 30, syph. 6)	106
Failure of treatment (gon. 72, chan. 38, syph. 5)	115

The number 70,954, reported above as going on liberty, does not include every man. But it covers most of the liberty given by ships during the year and the number (exceeding the average strength of the Navy and Marine Corps) is considered sufficiently large to serve as a basis for a fair estimate of the value of the scheme.

Liberty was given in all the principal ports on the station, from the southern Philippine Islands to Vladivostok, and the ports visited probably represent the two extremes of cleanliness as regards venereal diseases. At Cavite, Manila, and Olongapo, prostitution is under police supervision and medical inspections are regularly made. In Japanese ports the same system is supposedly in use, although clandestine prostitution reduces the value of the system as affecting enlisted men. Chinese ports are notoriously unclean, although some of the men serving on vessels habitually stationed in one or two ports, consort each with some one woman. On the other hand the "sam-pans" hanging about the ships and generally handled by women offer opportunities for promiscuous exposure. So the average conditions to which men serving on this station expose themselves may be regarded as similar to those in any other part of the world. The duration of liberty, which is an important factor in the present scheme, generally extends from one afternoon until the following morning.

The percentage of "failures to report" upon return from liberty was 7.5. There have been monthly fluctuations in this percentage, but the average for the last half year is about the same as for the first, indicating no improvement in this particular. This fact is to be regretted, as 18.86 per cent of the total number of venereal admissions is attributed to this cause. As this is one of the controllable causes that reduce the efficiency of the scheme, it should receive more consideration than it has. As already stated, men who fail to report are restricted "for observation" for a period of at least three weeks. But it appears that this restriction and daily inspection are not sufficiently disciplinary to compel compliance with the order to report and more severe measures would seem to be indicated.

The percentage of "denials of exposure" was 67.75. There has been a constant monthly increase of this percentage, and this, or what amounts to the same thing, a steady diminution of the number admitting exposure, may have some ethical significance. The prominence given to the question of venereal disease by commanding and medical officers, the talks on personal hygiene, the institution of the prophylactic scheme in itself, have, in the writer's opinion, been beneficial by bringing the better class of men to a greater realization of the evils frequently resulting from exposure, and by stimulating a latent moral sense. In any event, there is no reason to think that a sense of security engendered by the scheme has caused any increase in indulgence. The claim that the scheme will cause a great number of concealments of disease has also been refuted on the *Charleston* by a recent examination of the entire crew, not a single case of concealed disease being found.

The percentage of cases attributed to "denial of exposure" and consequent nontreatment was 14.19, nearly the same as that due to "failure to report." If failure to comply with the order to report be considered an offense, still more should be a deliberate falsehood. A man who exposes himself and fails to take advantage of the means provided for the prevention of resulting disease, or who evades treatment by a deliberate falsehood, deserves no consideration, and should be punished to the full extent allowed by regulations, which, if necessary, should be amended to meet the situation. It is in this particular that the support and cooperation of the commanding officer is necessary to render the scheme effective. It occasionally happens that a latent, supposedly cured gonorrhea is lighted into activity by alcoholic indulgence without venereal exposure. In these cases men can honestly deny exposure, and it becomes a perplexing question whether their statements should be accepted or not. If they admit knowledge of the existence of uncured gonorrhea, with occasional discharge, and have failed to report it, they have to this extent concealed it, and should suffer the penalty. In the absence of positive evidence it is, however, better in these cases to accept the men's statements, and to restrict and keep them under treatment until the certainty of a cure is established. Medical officers occasionally discharge a man as cured too soon. On the *Charleston* it is the practice to keep a man under observation for at least three weeks after all discharge has ceased and all treatment discontinued.

Of the total number of cases 14.19 per cent are attributed to over-staying and 23.37 per cent to extended liberty. By the former is meant those cases occurring among men who remain ashore after the expiration of authorized liberty and who consequently fail to get timely treatment. Their delinquency is usually associated with

excessive venery and alcoholic indulgence. This class is the one to whom prophylaxis is least applicable. But as they are generally restricted to the ship for a long period after their return, ample time is afforded for treatment and opportunities for fresh exposure are greatly reduced. A few of these cases might remain sufficiently responsible to avail themselves of the means which will be suggested further on, but as a rule their complete subjugation by liquor will prevent the success of any scheme. By the latter (extended liberty) is meant those cases occurring among men who have authorized leave for a longer period than the usual liberty period, and among this class has also been included those cases in which treatment was delayed for more than twelve hours after exposure. The new form, already referred to and shown below, will, however, report the latter as a separate class. From the very fact that they are granted this privilege they generally represent the better class of men and those willing to use the preventive means if available.

Monthly report on prophylaxis in venereal diseases.

U. S. S. _____,
Month of _____ 19__.

Should include admissions during current month only, no readmissions.

Total number of returns from liberty shown by ship's records : _____ (Should agree with total "admitted exposure," "denied exposure," and "failed to report.")

Returned.	Number reported.	Admitted exposure.	Per cent	Denied exposure.	Per cent.	
On time ^a
Overtime.....
Extended liberty.....	Failed to report. Per cent.
Total

^aTwenty-four hours or less.

Venereal diseases.

Total number of cases----- Per cent (based on total returns from liberty)-----

Probable causes.	Classification of cases.				Per cent of total cases.
	Gonor-rhea.	Chaneroid.	Syphilis.	Total.	
Failed to report					
Denied exposure					
Failure of treatment (admitted expo- sures):					
Overstayed liberty					
Extended liberty					
Treatment early ^b					
Treatment late ^c					
Total					

^b Within twelve hours of exposure. ^c Excluding "overstayed liberty" and "extended liberty."

Percentage of failure of treatment, when given early (based on total number "admitting exposure")-----

Remarks (additional facts bearing on failure of treatment when given early):

Very respectfully,

-----,
Surgeon, U. S. Navy.

Third Squadron Commander, United States Pacific Fleet.

We now come to those cases attributed to "failure of treatment," constituting, on this report, 29.38 per cent of the total number of venereal cases. This figure, however, represents a larger percentage than can be fairly attributed to this cause. The scheme was, during the early part of the year, in an experimental stage, and owing to the lack of a thorough understanding of the intent of the form, which was, as already stated, somewhat vague, a number of cases were reported under this class that were really due to "delayed treatment." It was also discovered that some medical officers were not using the remedies in sufficient strength, a 2 per cent protargol solution having in some cases caused considerable smarting. In some instances supervision of treatment lacked thoroughness and some cases may have been recurrent, uncured cases being lighted up by sexual and alcoholic excesses, in which cases prophylaxis is of no avail. It is expected that with the removal of these causes and a greater familiarity with and more thorough application of the scheme the failures, pure and simple, will be greatly reduced.

The number admitting exposure and receiving treatment was 21,166. Among these 176, or 0.83 per cent, developed disease. Comparing this with the total number failing to report and not treated

(5,319), among whom 113 or 2.12 per cent, developed disease, shows a difference which is sufficiently significant without further comment.

Now, having, it is hoped, proved the efficacy of timely prophylactic treatment, how can we apply it to those men who still swell the venereal list, those not getting timely treatment on account of over-staying and extended liberty, or among whom treatment is delayed on account of too long an interval between exposure and return to the ship?

The solution of this problem is very simple. The Germans solved it a number of years ago. In their service the remedies are put up in packages of convenient size, consisting of a small, collapsible tube, containing protargol solution, fitted with a rounded nozzle which can be inserted into the meatus, and a larger collapsible tube containing calomel (?) ointment, both contained in a paper box with absorbent cotton and printed directions. These packages are for sale in the ship's canteen at a nominal price, the crew are advised to provide themselves with this outfit, which is easily carried in the pocket, before going on liberty, and development of disease, through failure to use the treatment, is regarded as a military offense. These packages are prepared by a firm in Berlin, and it appears that a firm in the United States has prepared a similar outfit, which has been used on board some of our ships. This outfit, with the addition of a "bichloride" tablet, should serve the purpose perfectly. They are a decided improvement upon the bulky "K" packages used at some of our army posts and upon others suggested by members of our own service. The German tubes are made of collapsible metal, and having screw tops, can not break or leak. The use of this outfit would permit treatment at the time of exposure and the cases now due to extended liberty or delayed treatment and probably some cases now due to over-staying liberty would be eliminated. The necessity for treatment aboard ship, with its consequent publicity, inconvenience, interference with ship work, and other objectionable features would be removed.

The total venereal diseases included in this report number 599 or 0.84 per cent of the total number going on liberty. This includes primary admissions only. Readmissions for recurrence or on account of transfers are not included. Nor are there included any of the frequent complications nor sequelae. This fact, upon comparison, may cause a seeming discrepancy between the number of venereal cases in this article and those entered on the statistical reports from this station; and there are still many uncured cases (syphilis, gonorrheal arthritis, orchitis, etc.), on the station which will maintain the number of sick days at a high figure for some time. There are no available data for the comparison of the number of cases included in this report with those reported from this station in former years, and as the number is dependent upon the complement, amount of

liberty, and other factors, it is impossible to state to what extent prophylactic treatment has actually reduced venereal disease (vide p. 391). And the writer has reason to believe that the application of the scheme has caused more cases to be reported, which fact has helped to swell the number reported, making comparison with previous years, based on complement alone, unreliable. The recording of venereal cases has not infrequently been neglected in previous years from the fact that many men continued to perform duty while under treatment; but through the interest aroused by the scheme medical officers now admit all cases for record. The prominence given to the subject has helped to maintain the interest in this usually unattractive class of diseases and will result in greater interest in the individual and better efforts to effect a permanent cure.

The extent to which venereal disease has caused damage to the service may be gathered from the following: In his last annual report the Surgeon-General gives the following as the number of admissions in the entire Navy and Marine Corps during 1908; Gonorrhea 3,015, chancroid 665, syphilis 1,001, total 4,681. This, based upon the average strength, which is given as 50,984, makes a ratio of 91.8 per 1,000. The venereal admissions constituted 17.76 per cent of the total admissions for all diseased, and caused a total of 106,526 sick days. In his report for 1907 it was also stated that if applied to the force afloat, venereal disease alone would have operated to render entirely inactive for over a month three battle ships with a complement of 1,000 officers and men each.

Applying the reduction (about which there is no question) in number of admissions on this station alone to the entire service, with a still further possible future reduction by elimination of the cases due to "extended liberty" and "delayed treatment," by moving the place of treatment from ship to shore, some opinion may be formed as to what the adoption and enforcement of a prophylactic scheme will mean for the service. Surely it would seem worth while.

And even if the results after further trial should be less than claimed or hoped for, the extension of the scheme to the entire service is sufficiently promising to justify a trial. The subject is not a pleasant nor perhaps a dignified one, but should no longer be ignored by those having the interests of the service at heart.

Prophylactic treatment does not appear to have disturbed the relation in number of cases usually existing in the different classes of disease. But some facts have been observed which would indicate some effect on the virulence of contagion. It has been observed on the *Charleston* that many of the venereal ulcers, classed as chancroid, appearing in spite of treatment, were very small, and healed promptly after cauterization, without lymphatic involvement. In

fact, it at times became a question as to whether they were real venereal sores or simply an herpetic eruption, possibly due to the irritating effect of the calomel ointment, which is always allowed to remain. The cases were all marked by the absence of any tendency to extend. The few cases of gonorrhea occurring after treatment appeared less acute. In a few instances the protargol injection was followed by a slight discharge, which was, however, free from gonococci and disappeared in a few days.

As a result of a year's experience and observation, the writer feels justified in submitting the following conclusions:

That venereal diseases can be almost entirely eliminated from the naval service by timely prophylactic treatment.

That, since venereal diseases cause greater damage to efficiency and loss to the Government than any other, nothing should be permitted to stand in the way of the general adoption of this treatment.

That its efficient application is dependent upon departmental authorization and the cooperation and support of those in command and having disciplinary powers.

That with such support and authorization the medical officer is responsible for the existence of venereal disease and that upon him must fall the opprobrium of its existence.

Addenda:

The following summary is compiled from the prophylactic reports of February, 1910, including the one for January from the *Villalobos* (which had been delayed), and excluding the report from the legation guard at Peking, which has not yet been received:

Total number of men who went on liberty-----	9,408
Reported upon return-----	9,303, or 98.88 per cent.
Failed to report-----	105, or 1.116 per cent.
Admitted exposure-----	1,714, or 18.42 per cent.
Denied exposure-----	7,589, or 81.57 per cent.
Total number of venereal cases-----	57
Gonorrhea-----	36
Chancroid-----	15
Syphilis-----	6
Percentage of total number of cases (based on the total number who went on liberty)-----	0.61 per cent.

Probable cause.

Failed to report, 15 (gon. 13, chan. 2)-----	per cent--	^a 26.31
Denied exposure, 4 (gon. 3, syph. 1)-----	do-----	^a 7.01

^a Based on total cases.

Failure of treatment (admitted exposures).

Overstaying liberty, 1 (gon. 1)-----	per cent--	^a 1. 76
Extended liberty, 19 (gon. 10, chan. 7, syph. 2)-----	do-----	^a 33. 33
Treatment early, 10 (gon. 4, chan. 5, syph. 1)-----	do-----	^a 17. 54
Treatment late, 8 (gon. 5, chan. 1, syph. 2)-----	do-----	^a 14. 04
Failures of treatment (based on number reporting and treated on time, 1,562; cases, 10)-----	per cent--	. 64

As compared with the January report, there has been a decided increase in the percentage of cases due to "failure to report," "denial of exposure," and "failure of treatment," with a reduction of cases due to "extended liberty" and "late treatment."

DRIED BLOOD SERUM. A SUBSTITUTE FOR FRESH BLOOD SERUM IN THE RAPID PREPARATION OF LÖFFLER'S MEDIUM.

By Asst. Surg. E. W. BROWN, U. S. Navy.

The object of this paper is to describe a method for the preparation of Löffler's blood serum medium on board ship. This has always been a difficult matter for medical officers, because of the labor and care necessary to obtain fresh serum. It is obviously not practicable to carry such material on board, and a supply of prepared slants is rarely available. The use of blood albumin as a substitute for the fresh serum has been recently proposed by Surgeon Stitt, U. S. Navy. This material, however, must be chemically pure and the great expense renders it impracticable. The commercial article, while obtained at low cost, contains chemical preservatives making it useless for culture media.

The chief difficulty in drying organic fluids is the tendency to a change of solubility of the proteids. This difficulty has been surmounted in the case of milk by the Merrel-Soule Company, of Syracuse, N. Y. This dried milk, under the trade name "Tru Milk," has had considerable use throughout the service. The chemist of the concern, Dr. George A. Hanford, reports that the dried material suffers no change of composition in any essential respect.

The success in the manufacture of the dried milk suggested to the writer that a similar process might be applied to blood serum, the serum being dried in toto, free from preservatives, and at reasonable cost. It was requested that the matter be taken up by the company. Accordingly, several samples were forwarded prepared from fresh beef serum. These were sealed in small tin cans and were received on board the U. S. S. *Vermont*, January 2, 1910. None were opened until the ship returned to Hampton Roads from Guantanamo, March 30, 1910. Through the courtesy and cooperation of Asst. Surg. G. F.

^a Based on total cases.

Clark, blood serum slants were prepared from the material on board the U. S. S. *Solace*. A 12½ per cent solution of the dried serum was made, this corresponding approximately to the proportion of solids in the original serum, the solution being readily effected by rubbing up with mortar and pestle. Glucose bouillon was added as in the usual method, inspissation carried out at 70° C. for two hours, and sterilization effected in the dressing sterilizer at 8 pounds pressure for thirty minutes. The results were excellent and compared favorably with slants as ordinarily made from fresh serum. The coagulum was firm and free from bubbles. Inoculations were made from a pure culture of diphtheria bacillus and typical growths obtained. Through the courtesy of Prof. F. B. Mallory, facilities were furnished at the Boston City Hospital for testing this serum further. The dried serum samples opened after a period of nearly five months were free from all signs of deterioration. A large number of tubes were prepared and again uniformly good results were yielded. Inoculations were then made directly from a large number of throats of diphtheria cases in the hospital. A control was made by inoculating tubes made from fresh serum and from the same clinical cases. The stained preparations were equally typical in all cases, whether from the dried or fresh serum.

The writer suggests that incubation of culture media could be effected on board ship in the pocket condensers of engine rooms. The temperature of these spaces, well closed, is sufficiently high at sea for practical clinical purposes and in an emergency could be easily available. The adoption of dried blood serum by the service is urged as both a simple and ready means of preparing Löffler's medium.

U. S. NAVAL MEDICAL SCHOOL LABORATORIES.

THE NEED FOR A PATHOLOGICAL COLLECTION AT THE U. S. NAVAL MEDICAL SCHOOL.

By Surg. C. S. BUTLER, U. S. Navy.

This is a matter which has interested nearly every officer who has served as an instructor in this institution and should be of interest to every medical officer in the service. What would be the object and what the advantages of such a collection? First, to get into a single place and in a form as permanent as possible, interesting pathological material (now going to waste) of a certain class, which usually can not be seen in a general pathological museum, and which would thus be made available for every officer in the service at all times. Second, to use for class-room instruction. This would of course be the principal advantage of a pathological collection of this kind. In the Army Medical Museum we have here in Washington one of the best pathological collections in the world. This is of course available for anyone who wishes to take advantage of it, but manifestly it is impossible to use this great collection for a class. Furthermore, it is a general and not a technical collection. What would seem to be of greatest advantage to us here is a collection of tropical and helminthological material. We give, amongst others, courses in tropical medicine and parasitology, and nothing would add more to the value of the school than a good gross collection covering these subjects.

What class of material would be desirable? Of course some discretion would be necessary on the part of medical officers saving pathological material destined to come to the school. For gross pathology there would be no need of sending in material such as could be obtained here, though gross specimens can generally be exchanged with other museums. But material of all kinds which could be classed under tropical diseases would be very gladly received. Again, anything in the line of animal parasites would be most acceptable. Temporary or ecto-parasites which serve as intermediate hosts in disease transmission would be especially desirable. Then, too, blood smears of interesting conditions; while these are not gross specimens, they can always be used and prepared, if deemed advisable, for the permanent microscopical collection.

Plan for making this collection.—To get the desired material there must be some plan for collecting and preserving and also for sending it to the laboratory. Of course this could only be done by the service medical officers and the hospital corps. Most of our hospitals have, perhaps, a small collection on hand which will never be of any service in its present condition. Doubtless much of this would be of interest if only it could be got into proper shape. If a list of this material, together with any legend that may be attached, could be sent in we could select such as would be desirable from this list.

For getting further material, two methods are available: First, that each naval hospital consider the Washington laboratory a part of its own establishment and save all interesting material, medical or surgical, for transfer here if desired; second, that each medical officer remember the needs of the laboratory when visiting ports, particularly in the Tropics, and endeavor to secure material which would be of interest to himself and others in the corps. In many large tropical cities the civil hospitals have pathological material of certain types far in excess of their wants. They would in many cases be glad to get rid of some of it because of its very abundance. One of our ships visiting Madras, India, would doubtless have opportunity to get material from cases of kala-azar (a spleen or portion of liver). Such material would be eminently desirable from the standpoint of any school teaching tropical medicine in temperate climates. So with yellow-fever material, if a ship should visit Rio; with verruga material for one visiting Callao; with Madura foot for one visiting ports in the area of its endemic occurrence.

Naval medical officers do not usually appreciate the great advantage they have from time to time as collectors of such interesting and rare material. Concerted effort along this line would ultimately result in a valuable asset to the entire service.

Methods for preserving and forwarding material for gross specimens.—Interesting specimens, in whatever manner preserved, would be desirable, but where the specimen is obtained fresh and can be controlled from the start, one of the following methods (depending upon the character of the specimen) would be most approved. The following method for preserving specimens of morbid anatomy is the one followed at the Army Medical Museum: "So far as known at present the Kaiserling process, or some modification of it, is the best means of preserving from decomposition, and in their natural colors, specimens of morbid anatomy. In order to get the best results, however, it is necessary that the specimens should be obtained soon after removal from the body, whether by operation or post-mortem examination. Such specimens should be carefully washed free of blood and other foreign matter, but should not be soaked in water. Between the time of removal and of receipt by the person having charge

of the preservation, the specimens may be kept in dry cotton; gauze makes characteristic imprints on delicate tissues.

The Kaiserling process consists of three stages: A first solution, a transfer to alcohol, and a third solution. These liquids should preferably be kept in large shallow dishes or jars, and when markedly discolored or showing a marked sediment should be replaced by fresh liquids.

The first solution consists of water, 1,000 c. c.; formalin, 200 c. c.; potassium nitrate, 15 grams; potassium acetate, 30 grams; dissolve. If the water is reasonably clear this solution need not be filtered. It hardens the specimen, and it is necessary, therefore, that the specimen should be "oriented," that is, before immersion in the first solution it should be placed in such position as will retain the parts in the desired relation. Plates of glass or glass rods bent into the proper shape may be used for this purpose. In specimens that include the gall-bladder this had better be emptied previous to immersion; otherwise the bile is liable to persistently soak out and stain the solution. Large organs, as the liver, should be sliced into at intervals of about half an inch, in order that the fluid may penetrate into the interior; but in most cases a section of the liver or other large organ, about one-half inch thick, will show as much and sometimes more than the entire organ.

Specimens are kept in the first solution from a few hours to two days, according to their thickness. They are then removed, rinsed with water, and placed in alcohol, 90 to 95 per cent. The first solution changes the red color of the specimen to a brown, by converting the hemoglobin into methemoglobin; the alcohol restores the red color. The reaction is prompt, but it is advisable to keep the specimen in the alcohol for from two to eight hours, according to its delicacy or thickness. Too prolonged immersion in alcohol, as is well known, causes the color to fade.

The specimen is then removed from the alcohol, drained for a moment, and placed in the third liquid, which consists of clear water, 1,000 c. c.; glycerin, 200 c. c.; potassium acetate, 100 grams; dissolve and filter. Good filtering paper will do. If the specimen is to be permanently mounted in this solution it will be advisable to add one-half of 1 per cent of formalin to preserve from mold, which is apt to attack especially intestinal preparations. But if the specimen is to be mounted in gelatin the formalin should not be added.

To transport such specimens to a distance, they may be placed in cotton wet with the third liquid, and then in a tin box, soldered to keep from leaking; this box, protected by sawdust or excelsior packing, is then placed in a wooden box."

Specimens may be kept permanently in Kaiserling No. 3, or may be mounted in gelatin. Watter's technique for doing this is a con-

tinuation from the Kaiserling process, and as it is undoubtedly the best process yet devised, it is given in his own words for those who desire to mount specimens for their own use:

THE FINAL STEP—MOUNTING IN GELATIN.

The sooner this step is taken the better will be the preservation, as Kaiserling No. 3 tends to macerate tissues. Some of our best specimens have been subjected to this solution (No. 3) for less than an hour.

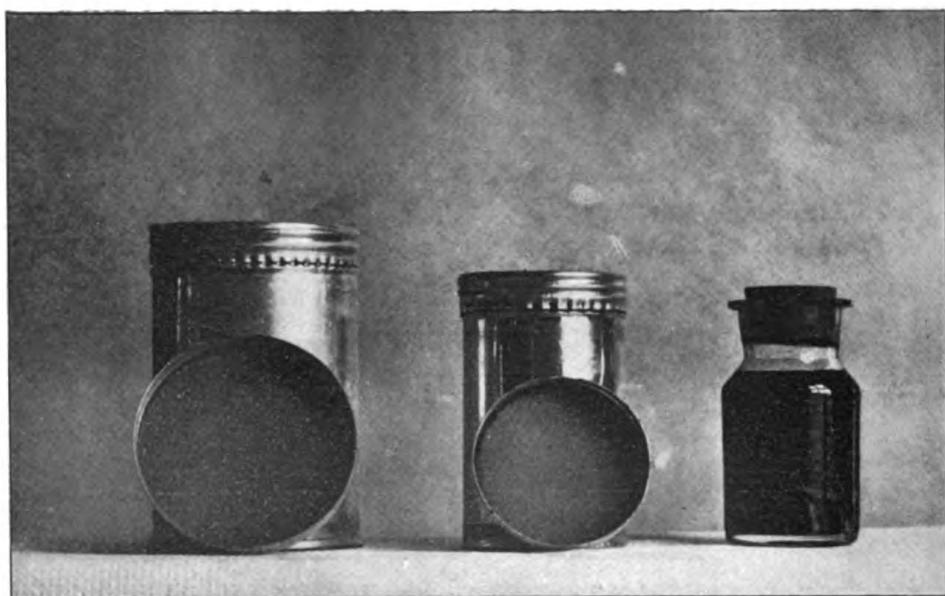
No. 4. Gelatin 200 grams
Kaiserling's solution, No. 3..... 3,000 c. c.

About three or four liters are placed in a good agate-ware pail, which is placed directly over a gas stove, the entire solution being brought to the boiling point in the shortest possible time. Care must be taken to prevent burning, although the danger is not great. When a temperature of about 55° C. has been reached, and the gelatin is nearly all melted, the white of one egg is added for every liter present, and the entire solution is rendered strongly acid by acetic acid. The coagulated white of egg helps to clarify, as does the acetic acid. In addition, the acid probably renders the medium a better color conservator. As soon as boiling becomes active the hot preparation is poured into a filter with two thicknesses of paper, and the clear solution is collected in the stock jar. When ribbed funnels are used no difficulty is experienced in the process, but with the smooth ones more rapid results are attained by placing the whole apparatus into a large steam sterilizer, where the gelatin will not solidify. After solidification a crystal of thymol placed on the top of the stock solution will effectually prevent the appearance of fungi.

In a container holding about two liters there should be but little more color to the solution than there is to pure water. In smaller amounts there should be practically no color at all. Having now prepared our medium we will proceed to the permanent mounting. This may be performed in square museum jars, round jars, test tubes, etc., according to the nature of the specimen, but will probably be more attractive and useful if made in a Petri dish. The thymol is now removed from the stock solution of gelatin and the bottle is placed in a steam sterilizer-for liquefaction. When completely liquid and at about a temperature of 45° or 50° C., a thin layer is poured into a Petri dish, and to it is added about one drop of formalin to each 20 c. c. of the solution. Into this is placed the specimen, face downward, where it is allowed to stay till the gelatin has become solid. More of the formalin-gelatin solution is now added, sufficient to almost, but not quite, fill the dish. This should be allowed to solidify thoroughly for ten or twelve hours in the ordinary room temperature. More of the same preparation is finally added, until a slight convexity is formed above the edge. A wet plate glass is now quickly placed on the liquid gelatin in such a way as to force out all of the air bubbles and rest evenly upon the upper edge of the dish. This may be performed in one of two ways. The plate may be allowed to touch first one side of the dish and then gently lowered in such a manner as to form a wave of gelatin that will drive out all bubbles. Or it may be pushed on from one side, the plate and dish being parallel, if an excess of the solution be maintained in front of the advancing edge. This being completed, it is set aside for an hour or more, with the plate still on top. The superfluous gelatin is now gently removed with a coarse brush and a cement of Canada balsam, with 20 per cent clove oil, is applied around the entire circumference. The next day the glass is carefully washed, another coat of balsam is applied, and the specimen is permanently mounted.

100

The new circumstances



MAILING CASE FOR PATHOLOGICAL MATERIAL.

Petri-dish mounting is more complicated and requires much more practice than do the jar mounts, but, as stated above, is much more attractive.

Great care must be taken in using the formalin. Too much will cause undue contraction of the gelatin and the appearance of air bubbles; too little will allow liquefaction with its resultant disadvantages. Just enough will (and has) preserved the specimen in practically perfect condition for years. Another point to be noted is the complete solidification of the full dish of gelatin before applying the cover. This allows of about all of the contraction that will naturally occur, thus tending to prevent the entrance of air bubbles. The Petri dishes are the same as ordinarily used in bacteriological work, and may be obtained in various dimensions. With the smaller ones common window glass may be used as bases, but for the larger ones plate glass will be preferable. Canada balsam, even with the addition of clove oil, is not a perfect sealing agent; it is, however, so much more pleasing in appearance than the various gutta-percha compounds that it is preferred. A fresh thin coat, quickly applied with a camel's hair brush every six to twelve months, will usually be successful.

Much simpler than the above is the mounting of specimens in jars and large test tubes. Here all that is required is to fill the container with a sufficient amount of formalin-gelatin, place therein the specimen, allow to solidify, and put on the top. In the majority of these cases a small air space is left at the top of the jar. Various parts of plants have been mounted in this No. 4 solution after fixation in a single formalin solution with good results. The same statement will apply to the preservation of flies, leeches, fish, snails, cock roaches, and many of the lower forms of life.

The advantages claimed for this method after a trial of six years are:

1. The permanency of the mounts.
2. The compactness and neatness of the specimen.
3. The easy adaptability for class demonstration and for use with the reflectoscope.
4. The successful preservation of colors on constant exposure to light.

In a future number of the BULLETIN, the question of the best methods of collecting, preserving, and mounting dipterous insects, fleas, ticks, etc., will be considered.

In the present issue, Garrison's article upon "Helminthological Technique" gives the approved methods of caring for material of this kind.

The means for forwarding pathological material depend upon the size of the specimen. Most pathological material can be forwarded, properly franked, by United States mail. A proper mailing case for this purpose is shown in the accompanying illustration (description follows).

The United States Postal Regulations covering the transfer by mail of pathological material are as follows:

SECTION 495, P. L. AND R., AS AMENDED BY THE POSTMASTER-GENERAL'S ORDER NO. 3064, APRIL 22, 1910.

Section 495, Postal Laws and Regulations, is hereby amended to read as follows:

Specimens of diseased tissues may be admitted to the mail for transmission to United States, State, municipal, or other laboratories in possession of per-

mits referred to in paragraph 3 of this section only when inclosed in mailing cases constructed in accordance with this regulation: *Provided*, That bacteriologic or pathologic specimens of plague and cholera shall under no circumstances be admitted to the mails.

2. Liquid cultures, or cultures of micro-organisms in media that are fluid at the ordinary temperature (below 45 C. or 113 F.), are unmailable. Such specimens may be sent in media that remain solid at ordinary temperature.

3. No package containing diseased tissue shall be delivered to any representative of any of said laboratories until a permit shall have first been issued by the Postmaster-General certifying that said institution has been found to be entitled, in accordance with the requirements of this regulation, to receive such specimens.

4a. Specimens of tubercular sputum (whether disinfected with carbolic acid or not disinfected) shall be transmitted in a solid glass vial with a mouth not less than 1 inch in diameter and capacity of not more than 2 ounces, closed by a cork stopper or by a metallic screw top protected by a rubber or felt washer. Specimens of diphtheria, typhoid or other infectious or communicable diseases or diseased tissues shall be placed in a test tube made of tough glass, not over one-half inch in diameter and not over $3\frac{1}{2}$ inches in length, closed with a stopper of rubber or cotton and sealed with paraffine or covered with a tightly fitting rubber cap.

4b. The glass vial or test tube shall then be placed in a cylindrical tin box made of I. C. bright tin plate, with soldered joints, closed by a metal screw cover with a rubber or felt washer. The vial or test tube in this tin box shall be completely and evenly surrounded by absorbent cotton closely packed.

4c. The tin box with its contents must then be inclosed in a closely fitting metal, wooden, or papier-maché block or tube at least three-sixteenths of an inch thick in its thinnest part, of sufficient strength to resist rough handling and support the weight of the mails piled in bags. This last tube to be tightly closed with a metal screw cap.

5. Specimens of blood dried on glass microscopic slides for the diagnosis of malaria or typhoid fever by the Widal test may be sent in any strong mailing case which is not liable to breakage or loss of the specimen in transit.

6. Upon the outside of every package of diseased tissues admitted to the mails shall be written or printed the words "Specimen for Bacteriological Examination. This package to be pouched with letter mail. See section 495, P. L. and R."

Since alcohol, owing to its inflammability, can not be used for sending specimens through the mail, those which would be damaged for the purposes for which they are intended by formalin must be forwarded in a special mailing fluid which will be contained in the specimen bottles when sent out from the laboratory. The mailing case consists simply of two screw-top tin boxes lined with paste-board. The inner box is $2\frac{1}{4}$ by $3\frac{1}{2}$ inches, and the outer one is $2\frac{3}{4}$ by 4 inches. The specimen bottle is placed in the smaller screw-top box and the whole inclosed in the larger. These mailing cases with the bottle and fluid will be forwarded to ships and hospitals from the Naval Medical School.

Larger specimens, requiring to be sent by express, would have to be deposited at naval hospitals, if on foreign stations, to await an opportunity for transfer to the United States on some home-coming

ship. Arrived at any naval station in the United States, the expressage to the Bureau of Medicine and Surgery or to the Naval Medical School would be paid by the general storekeeper. This same procedure could be followed by naval hospitals in the United States in sending boxes of pathological material to the Naval Medical School, i. e., through the general storekeeper of the station.

HELMINTHOLOGICAL TECHNIQUE.

1. METHODS FOR THE COLLECTION, KILLING, PRESERVATION, AND MAILING OF PARASITIC WORMS AND THEIR OVA.*

By Passed Asst. Surg. P. E. GARRISON, U. S. Navy.

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In connection with the effort which is being made to obtain a greater amount of material for the use of the students at the Naval Medical School, as set forth in the paper by Surgeon Butler in the present number of the BULLETIN, it is considered desirable to place before the medical officers of the service clearly and concisely certain simple methods for the proper handling of helminthological specimens. Inasmuch as the collector himself may frequently desire to study the material before sending it to the school, the essential points in the technique of staining, mounting, and sectioning of worms and their ova are briefly outlined in order that all material collected may be used to the best advantage.

* Part 2. Methods for the Study of the Parasitic Worms and Their Ova will appear in the next number of the BULLETIN.

The urgent need of depositing helminthological material which is collected by medical officers in a central collection is obvious. Not only is it thus made available for the use of the school, but, when properly classified, labeled, and indexed in the Medical School collection, its preservation is assured as it can not be if scattered among the various hospitals and ships; and, furthermore, it at once becomes available for study at any future time to the original collector or to any other officer of the service.

THE LABEL.

In order to properly label the specimen, the following information should be available:

The animal from which the specimen was collected and its location in the animal (topographical); the locality (geographical); name of collector and date collected; name of person sending the specimen; name of person by whom specimen was determined, if determination has been made; method of killing and preservation; and other remarks.

The method of choice in labeling is to place the label *directly in the bottle with the specimen*, and this may be done if the label be written with India ink and allowed to dry, or written heavily with lead pencil. Ordinary ink will fade. It is advisable that only one specimen, that is worms of one kind collected from one person or animal, be placed in a bottle; though two kinds of worms, very dissimilar, such as *Tania* and *Ascaris*, if collected from the same person or animal, might without confusion be placed in a single bottle with separate labels. Specimens from different persons or animals should never be bottled together. A good way to forward specimens where more than one is sent is to place a number in the bottle with each specimen and mail separately a list by numbers giving information for the labels.

Upon receipt, the specimen is given an accession number, and all information concerning it is entered in the helminthological collection catalogue. With the specimen is placed the following label:

U. S. NAVAL MEDICAL SCHOOL WASHINGTON, D. C. HELMINTHOLOGICAL COLLECTION	NAME.....	No. —
	HOST	REMARKS:
	LOCALITY.....	
	COLLECTED BY.....,, 191	
	PRESENTED BY.....,, 191	
	DETERMINED BY.....,, 191	

KINDS OF MATERIAL DESIRED.

There is a predisposition on the part of medical men generally to think that specimens of the commoner parasitic worms are not worth

keeping. There are at least two reasons why *all* such specimens are well worth the slight trouble and possible expense involved in preserving them and depositing them in some central collection; and these reasons are especially applicable in the present case. In the first place, the amount of material that can be used to advantage in class work is greater than any likely amount which can be supplied, even of the most common parasites; and in the second place, it is an uncertain or at the best a very difficult matter for the medical man without special training and with his limited available literature to positively ascertain that a specimen agrees in every particular with the characters of the species which it resembles in its general features. The history of helminthology presents numerous instances of specimens placed in collections under a determination which, while it may have appeared perfectly obvious at the time, was later, and perhaps years later, shown to be erroneous.

At the present time, therefore, there does not appear to be any reason for making any exception to the rule that all specimens, even those as common as *Ascaris* and whipworms in the Tropics, are well worth preserving and depositing in a collection. There is certainly no material which can not be utilized to good purpose at the school.

COLLECTING.

From the feces.—Intestinal worms and their ova are most frequently obtained from the feces of the living patient and, while such collecting would seem to involve no special technique, there are several points the observance of which are of help in the operation and tend to the better preservation of the specimens.

In the case of the larger worms, such as *Ascaris* and the large tapeworms, which are easily picked out, about the only precautions needed are to clean the worms of the fecal debris and to keep them as fresh as possible until they are killed. This is best done by transferring them promptly from the fresh stool to a dish of warm physiological salt solution. In the case of tapeworms it should be determined with a hand lens whether the small, pin-head-like head is still attached or must be further sought for.^a Worms should never be allowed to become dry.

Smaller worms, like hookworms, pinworms, whipworms, and the "dwarf" tapeworm, require careful searching, and this is best done by spreading portions of the fluid stool in a thin translucent layer in a glass dish or on a glass plate (table top), the glass being placed over a black background.

^a During treatment for tapeworm the stools should be passed into warm water to avoid contraction of the worm and possible breaking off of the head.

In picking out the still smaller forms, such as the adult trichinæ, the minute intestinal fluke, *Heterophyes*, and the detached heads of tapeworms, a hand lens is almost necessary, and it is advisable to make a routine practice of running over the material with a magnifier of low power in every case.

Should the stool not be sufficiently fluid to admit of the above manipulation, it must be thoroughly mixed and diluted with water, and this brings up the method of sedimentation which, while of special use in collecting ova, is frequently a valuable help in finding the smaller worms. If the stool be thoroughly mixed with a large quantity of water and allowed to settle in a tall vessel, the worms, together with the sediment, will sink to the bottom, while the lighter and finer material will remain suspended. If this be repeated several times, the water being decanted and fresh water added, the finer and more soluble part of the stool is removed, its odor destroyed, and the worms concentrated in the coarser sediment at the bottom, which may be examined as described above.

In collecting ova from the feces either for demonstration purposes or for experiment it is desirable to remove as much of the fecal matter as possible and to secure the eggs in a concentrated form. Sedimentation, applied practically as described above for small worms, is the best generally useful method for accomplishing these ends. The specific gravity of the ova is from 1.050 to 1.100 (old eggs sometimes higher, according to Bass). If the stool be liberally diluted with tap water the mixture has a considerably lower specific gravity, which varies of course with the character of the stool, but is usually about 1.005; so that the ova, together with the heavier sediment, sink to the bottom. It is well to allow the solution to stand for an hour or more until the settling of solid particles is complete. The fluid is then decanted down to the sediment and fresh water added. When this has been repeated several times, the number of times varying with the amount of soluble material in the specimen, all soluble matter will have been washed out, the fecal character of the stool largely destroyed, and the eggs will be contained in the relatively small amount of sediment. If the stool be large and fairly solid it is well to use a large quantity of water, perhaps 5 to 10 liters, for the first sedimentation, and the water should be run in violently and the mixture well stirred to break up all small masses of fecal matter. While frequently a considerable quantity of solid material will rise to the top because of its lighter specific gravity and may be poured off with the water, the minute bubbles of air forced into the mixture with the water may buoy up to the top a layer of solid matter which, on examination, is seen to contain many eggs. Stirring this top layer from time to time allows the air to escape and the ova to settle. At any time during the sedimentation, but

preferably after the specimen has been washed a few times, the coarser material may be removed by straining and washing the sediment through a fine wire gauze, using a small, strong jet of water. To completely wash a specimen until the supernatant water is clear may require quite a number of sedimentations, and it may be desirable to continue the process throughout one or more days, in which case, if it is not desired to grow the eggs, a little formalin (about 4 per cent) may be added to the water, especially in warm weather, to check development of the eggs and prevent decomposition. It is well to defer the addition of formalin as long as possible since it may coagulate some of the soluble material.

Sometimes the feces contain heavy, gritty, solid material which is particularly annoying in making slide preparations. The specific gravity of much of this material is sufficiently higher than that of the eggs to allow the use of a solution with a specific gravity between the two which will float the eggs to the surface and allow the heavy sediment to sink. This may be done by suspending the specimen, preferably after it has been well washed, in a solution of calcium chloride containing 350 grams to the liter of water, which gives a specific gravity of about 1.200 (a saturated solution of the commercial salt has about the same specific gravity). The top layer, containing eggs and the lighter débris, is decanted, leaving the heavy sediment behind.

This method of floating the eggs to the surface by the use of a heavy solution of calcium chloride was published by Bass^a in connection with a rather elaborate procedure for concentrating the eggs of hookworms. While it would not seem to have a very wide usefulness, the method of Bass is possibly useful in detecting ova in cases of very light infection or in preparing a display slide of eggs free from débris. It consists essentially in centrifugalizing the diluted feces first in water so that the ova and heavier débris will be thrown down, then recentrifugalizing in calcium chloride solution to throw down the heavy material, leaving the eggs on top. The use of the centrifuge usually accessible prohibits the handling of more than a small quantity of feces and, according to the author, great care is necessary to carry the centrifugalization just far enough and not too far. It gives quicker results, but the actual time consumed is about the same as in sedimenting, since the sedimentation jar or pail can be decanted and refilled in a moment and left to settle while the operator proceeds with other work.

From the urine and sputum.—Sedimenting the urine once or twice is all that is needed to obtain ova of *Schistosoma* almost free from

^a Bass, C. C., M. D.: "Mild Uncinaria Infections." Archives of Internal Medicine, June, 1909, reprinted by the American Society of Tropical Medicine, 1909.

foreign matter. To get *Paragonimus* eggs free from the mucus and débris of the sputum repeated sedimentation is needed, running the water in violently and stirring to break up tenacious masses.

From the intestine.—The smaller forms of worms, which are at the same time usually the more valuable and more important specimens, are frequently overlooked at autopsy because of lack of time or care in looking for them. In the usual hurried examination, which is all the pathologist may feel he has time to give to the intestine, the smaller and more delicate worms and even the comparatively noticeable hookworm are very apt to be overlooked unless very numerous. The following is given as a routine method of procedure, though it should be emphasized that where such an examination can not be made the possible specimens present can be secured and forwarded to the school or kept for later examination by simply laying the intestine open and scraping its contents into water to which about 4 per cent formalin has been added.

When possible to make a careful examination the intestine should be laid out on a flat surface, preferably of glass. Enter enterotome or blunt point of scissors at stomach end (or stomach may be opened with the intestines) and keep track of approximate distance from stomach or cecum. The point of scissors inside the gut should be kept close against the mucous surface to avoid cutting the worms. As the intestine is opened, a section at a time, it should be laid out flat and all visible worms secured. If the subject is fresh the worms will still be attached to the intestinal wall, and if it is not desired to preserve the ova the intestinal contents may be carefully removed and disregarded. If the body has been cold for a number of hours the parasites may lie free in the lumen and the feces should be examined, lightly scraping them off and sedimenting them as above described. The mucosa should be carefully gone over, first with the naked eye and then with a hand lens, turning the valvulæ back and forth, as the smaller worms sometimes lie completely concealed under their folds. Washing the surface with a stream of water from a small tubing is of great help in searching for the worms, catching the water in a vessel so that it may be examined for worms washed out. Care is necessary not to injure the worms in loosening the heads when firmly attached, especially tapeworms. Traction with forceps should be used as little as possible. It is better to scrape off the mucosa with the worm or if the piece of gut is placed in warm salt solution the head can usually be detached by gentle manipulation. As the worms are collected they should be placed in a dish of warm salt solution where the fecal débris is washed off and the knots and tangles of tapeworms may be unraveled.

From the blood and lymphatics.—As a rule, probably the best method of preserving in bulk the delicate worms found free in the

blood stream (*Microflaria*, *Schistosoma*) is to collect all the blood obtainable, dilute with sodium citrate solution (1 per cent), allow it to settle in a vessel and wash once or twice with salt solution by sedimenting and decanting. To preserve, add 1 per cent formaldehyde or plunge the sediment containing the worms into 70 per cent alcohol heated to about 80° C. The usual method of securing dry specimens of *Microflaria* from the blood is to make a thick, even smear on a slide, allow it to dry and then fix in the flame. *Schistosoma* may possibly be found by slitting up the vessels of the portal system as far as possible and examining their walls with a hand lens. The adult filaria found in the heart or lymphatic duct offer no special problems, simply being transferred to warm salt solution preliminary to their proper killing and preservation.

From the bile ducts.—To secure flukes from the bile ducts, the bladder and ducts may be slit up as far as possible and the worms searched for, or we have frequently found it more satisfactory to cut off the ends of the main ducts of each lobe where they converge and force the flukes out by squeezing the lobe inward from the periphery. As the parasites are sometimes hard to detect, it is well to immerse the liver and hands in a dish of warm water or salt solution from time to time, when the worms will be washed off and sink to the bottom.

From the tissues.—For minute forms like larval trichinæ embedded directly in the muscles, and *Schistosoma* worms and ova in the walls of the bladder, rectum, or other tissue, the tissue itself is secured and treated like any other pathological tissue. In cystic forms, such as *Cysticercus* and *Paragonimus*, the cyst should, as a rule, be dissected out and opened, and the free worms placed in salt solution.

KILLING AND PRESERVATION.

Having been collected in warm salt solution, it is important that the worms be killed and preserved by proper methods. By killing is meant of course the cellular as well as somatic death of the organism, so that killing methods must be applied even though the organism as a whole has been some time dead. For roundworms (nematodes) a solution of hot alcohol is used, while for the flatworms (cestodes and trematodes) a solution of bichloride of mercury gives the best results.

Flatworms.—

Killing solution:

Saturated aqueous solution of bichloride of mercury.

Seventy per cent alcohol, equal parts.

Mix and add 1 per cent glacial acetic acid.

While this solution may be used cold, it acts better if heated to about 70° C., removing the flame when the worms are put in. A generous quantity of the solution should be used and it should be

allowed to act for from ten to thirty minutes, according to the size of the specimen.

From the salt solution in which they have been collected the worms should be transferred to the killing solution either by picking them up singly with a wood or glass lifter, by draining off the salt solution and sliding the worms together into the killing solution, or by pouring the hot bichloride solution on the specimens. If iron instruments are used a black precipitate is formed which is apt to discolor the specimen.

The flatworms having thus been killed, it is desirable to remove the bichloride lest its continued action should injure the tissue, and this is done by washing the specimens several hours in running water or in a vessel holding a large quantity of water and then transferring them to a 70 per cent solution of alcohol, well, though not too darkly, colored with iodine. The iodine acts with the mercury in the tissue to form a colorless, soluble compound. As the color of the iodine fades it should be renewed until its color is no longer abstracted. Excessive treatment with a weak solution of iodine does no particular harm. It may tinge the worms brown, but this color is removed later by the alcohol in which they are preserved.

From the iodine alcohol the specimens are transferred for preservation to 70 per cent alcohol containing 5 per cent glycerin, in which they may be kept indefinitely. The glycerin insures against injury of the specimens by drying in case the alcohol evaporates, and is considered by some to improve the preserving qualities of the alcohol.

Roundworms.—The nematodes and other roundworms are best killed by immersing them directly in 70 per cent alcohol which has been brought to just about the boiling point (about 80° C.). If the worms are fresh they will straighten out in the hot alcohol to their normal (at rest) shape. They should be left in the alcohol until it cools and may then be transferred to the 70 per cent alcohol-5 per cent glycerin mixture for preservation. As far as practicable the preserving bottle should be of a form and size not excessively to distort the worms.

Ova.—Of the various methods published for preserving the eggs of parasites, so far as we have been able to determine, none is entirely satisfactory in all cases. The heavy-shelled eggs, like *Ascaris* and *Trichuris*, will stand almost any treatment, while those with thin shells, like the hookworm and the dwarf tapeworm, will often be shrunken and distorted in spite of the most painstaking technique.

As a routine we have come to consider the most satisfactory method to simply wash the feces, sputum, or other excreta by sedimentation as described for the collection of ova and then simply add 4 per cent formalin to the sediment containing the eggs. From this formalized material slides can be made up whenever it is desired to study or demonstrate the ova.

Another good method is to plunge the washed sediment into hot 70 per cent alcohol. When the alcohol has cooled the specimen can be further washed by decanting and resedimenting several times with alcohol, which removes considerable coloring material which was not soluble in water. When thoroughly washed the 70 per cent alcohol is replaced by the 70 per cent alcohol-5 per cent glycerin mixture and the specimen placed at room temperature in an open dish, when first the alcohol and then the water evaporate, leaving the ova and remaining sediment strongly concentrated in the clear glycerin. This method reduces the specimen to a small bulk and likewise prepares it for immediate mounting in glycerin jelly. With many eggs it gives excellent results, but unless it is carried out with extreme care to make the change from alcohol to glycerin very gradual, hook-worm and the other more delicate eggs are apt to shrink.

The above methods for the collection, killing, and preservation of parasitic worms are given as methods of choice which, when they can be applied, will secure the greatest amount of material in the best condition and at the least expenditure of time and effort which can accomplish the results. But, while these methods will give the best results, it is desired to again emphasize the point that where they can not be employed all helminthological material should nevertheless be preserved by simply throwing it into alcohol or formalin solution rather than that it should be lost entirely.

MAILING.

Unfortunately the post-office regulations will not allow alcohol to be sent through the mails, and we are thus deprived of our best preserving medium during the time specimens are in transportation. Formalin and glycerin material may be mailed directly. Since we have no substitute for alcohol in the killing and preserving of worms, it is proposed that specimens of worms be first killed and preserved in alcohol as described above and then at the time of mailing be transferred to a formalin-glycerin mixture. Upon arrival at the school they will be transferred back to the alcohol-glycerin preserving fluid. This formalin-glycerin mailing solution will be prepared at the school and sent out in each mailing case (see article by Surgeon Butler, page 339) ready for the worms to be immediately transferred and the case remailed. The bottles supplied with the cases are the regular specimen bottles of the helminthological collection, and are of a size found most generally useful. Two or more bottles may be used for a single specimen if the quantity of preserved feces (ova), or the number of worms (*Ascaris*, *Tænia*) be too great for one, care being taken that corresponding labels be placed in each bottle. If there be but a few small worms in the specimen, it is better to place them in a small vial, packing the vial well with cotton inside the mailing case bottle.

The publication of additions to the helminthological collection crediting the contributor in each case is contemplated for future issues of the BULLETIN.

SPECIMENS ADDED TO THE HELMINTHOLOGICAL COLLECTION, U. S. NAVAL MEDICAL SCHOOL, MARCH-MAY, 1910.

Catalogue number.	Name.	Host.	Collected by or received from—
68	<i>Agchylostoma duodenale</i>	Homo (a Brazilian)....	{ E. O. J. Eytinge, Naval Hospital, Norfolk.
69	<i>Necator americanus</i>		
70	Ova, <i>Schistosoma japonicum</i>	Homo.....	E. R. Stitt, Canacao.
71	<i>Dipylidium caninum</i>	<i>Canis familiaris</i>	1910 class, school.
72	<i>Ascaris canis</i>	do.....	Do.
73	<i>Dipylidium caninum</i>	do.....	Do.
74	<i>Microfilaria</i>	do.....	C. S. Butler, school.
75	Hookworms.....	do.....	1910 class, school.
76	<i>Tænia</i>	do.....	Do.
77	<i>Tænia</i>	do.....	Do.
78	<i>Ascaris canis</i>	<i>Felis domestica</i>	Do.
79	<i>Dipylidium caninum</i>	do.....	Do.
80	<i>Ascaris canis</i>	do.....	Do.
81	<i>Tænia</i>	do.....	Do.
82	<i>Ascaris canis</i>	do.....	Do.
83	<i>Dipylidium caninum</i>	do.....	Do.
84	<i>Ascaris canis</i>	do.....	A. Stuart and J. Stepp, school.
85	<i>Dipylidium caninum</i>	do.....	Do.
86	Ova, undetermined.....	do.....	H. M. Tolfree and C. E. Ryder, school.
87	<i>Tænia</i>	<i>Canis familiaris</i>	Do.
88	<i>Dipylidium caninum</i>	do.....	J. H. Payne and W. Seaman, school.
89	Hookworms.....	do.....	R. R. Richardson and H. A. Dunn, school.
90	Ova, undetermined.....	<i>Felis domestica</i>	Do.
91	<i>Trichosoma</i> (liver).....	<i>Mus decumanus</i>	C. S. Butler and P. E. Garrison, school.
92	<i>Trichosoma</i> (bladder).....	do.....	P. E. Garrison, school.
93	Nematode (cecum, appendix, and colon).....	do.....	Do.
94	<i>Cysticercus</i> (liver).....	do.....	Do.
95	Tapeworm (small intestine).....	do.....	Do.
96	<i>Trichosoma</i> (bladder).....	do.....	Do.
97	Nematode (asc. colon).....	do.....	Do.
98	<i>Cysticercus</i> (liver).....	do.....	Do.
99	<i>Trichosoma</i> (bladder).....	do.....	Do.
100	<i>Tænia</i> (small intestine).....	do.....	Do.
101	Nematode (colon).....	do.....	Do.
102	<i>Cysticercus</i> (liver).....	do.....	Do.
103	<i>Trichosoma</i> (liver).....	do.....	Do.
104	<i>Trichosoma</i> (bladder).....	do.....	Do.
105	<i>Cysticercus</i> (liver).....	do.....	1910 class, school.
106	Nematode (colon).....	do.....	Do.
107	<i>Trichinella spiralis</i> (muscles).....	do.....	Do.
108	Ova of { <i>Necator americanus</i> <i>Agchylostoma duodenale</i> <i>Schistosoma</i> (lat. spined)..... <i>Trichuris trichiura</i> }	Homo (a Brazilian)....	{ E. O. J. Eytinge, Naval Hospital, Norfolk.
109	<i>Ascaris</i>		
110	<i>Dipylidium caninum</i>	<i>Canis familiaris</i>	A. Stuart and J. Stepp, school.
111	<i>Ascaris</i>	<i>Felis domestica</i>	H. M. Tolfree and C. E. Ryder, school.
112	Tissue (cecum).....	<i>Canis familiaris</i>	A. Stuart and J. Stepp, school.
113	Nematode (colon).....	do.....	H. A. Dunn and R. R. Richardson, school.
114	Tapeworm (small intestine).....	<i>Mus decumanus</i>	P. E. Garrison.
115	<i>Trichosoma</i> (bladder).....	do.....	Do.
116	Tapeworm (small intestine).....	do.....	Do.
117	<i>Cysticercus</i> (liver).....	do.....	Do.
118	Nematode (colon).....	do.....	Do.
119	<i>Trichosoma</i> (bladder).....	do.....	Do.
120	Tapeworm (small intestine).....	do.....	Do.
121	Nematode (colon).....	do.....	Do.
122	Nematode (small intestine).....	do.....	Do.
123	Hookworms.....	<i>Canis familiaris</i>	J. Stepp and A. Stuart school.

DEMONSTRATION OF TREPONEMA PALLIDUM.

By Passed Asst. Surg. F. M. SHOOK, U. S. Navy.

At the present time there are three methods of demonstration of the treponema, as follows:

(1) *Giemsa's stain*.—This method is uncertain and unreliable. The treponemata do not take the stain well, and if few in number they may not be evident at all.

(2) *Dark field illumination*.—This method is both certain and reliable. In Professor Schlotz's clinic in Königsberg the treponemata were demonstrated in 98 out of 100 cases of syphilis with cutaneous or mucous lesions. Other observers report results as favorable. The technique is very simple, and from one to two minutes suffice for demonstration. Objections to this method are that expensive apparatus is required with an electric current.

(3) *The Burri India ink method*.—This was first devised by Professor Burri, of Jena, in 1909. He reported excellent results and his reports have been confirmed by a large number of observers. The technique is as follows:

(a) Make a scraping of suspected lesion (mucous patch, chancre, papule, etc.) with small scalpel.

(b) Stir up scrapings in watch glass with a few loopfuls of water or salt solution.

(c) Place one large loopful (5 mm. loop) of this suspension from the scraping on one end of a clean glass slide. Mix with it one large loopful of Günther und Wagner's Chinese ink.

(d) Spread this in a thin even film by touching the mixture with another slide, then drawing the latter along the slide so that the spread out drop is pulled along in a thin film. The film should dry in about one-half minute, if it is thin enough. After drying thoroughly, the film should be observed by the one-twelfth oil immersion lens.

The treponemata appear with their characteristic spirals against the dark field formed by the ultramicroscopic particles of the ink. The refringens and pallida are easily differentiated. The effect is the same as that of a photographic negative. Professor Schlotz, of Königsberg, says that in well-made preparations from material containing a moderate number of spirochaetae this method is as reliable as that of dark field illumination. This observation has been confirmed at the laboratories of the United States Naval Medical School. In syphilitic lesions in which the treponemata are present in very scanty numbers the use of dark field illumination is preferable to Burri's method.

**PRELIMINARY REPORT^a ON A PROPOSED METHOD FOR THE VOLUMETRIC
ESTIMATION OF MERCURY.**

(From Chemical Laboratory, U. S. Naval Medical School, Washington, D. C.)

By Hospital Steward J. R. HERBIG, U. S. Navy.

Mercury is obtained in the form of a mercuric salt, preferably the chloride. A neutral or faintly acid solution of this is obtained and to it is added a sufficient quantity of starch water and about 2 c. c. of hydrogen peroxide solution. N/10 potassium iodide solution is then added until the supernatant fluid assumes a faint blue color. The employment of an external indicator is avoided in this method.

^a Received for publication June 1, 1910.

SUGGESTED DEVICES.

AN "UNLEARNABLE" VISION TEST CARD FOR USE IN THE NAVAL SERVICE.

By Surg. E. J. GROW, U. S. Navy.

(Instructor in Ophthalmology, U. S. Naval Medical School.)

The best method for the determination of visual acuity has long been the subject of much controversy, especially since 1843, when K  chler first published a test chart constructed on somewhat scientific principles and which, with various modifications, may be considered as the basis of vision testing in use to-day.

Prior to that date very little was accomplished in this line; no charts were in use and little information was gained that could be considered as adding any light on the subject, with possibly one exception. In 1674 Robert Hooke determined that the normal eye could not clearly distinguish objects that subtended an angle at the eye of less than one minute. This measurement having stood the test of time is still accepted as correct and made use of in the construction of most modern vision test charts.

The history of the various improvements in charts which have been made in the last sixty years by Arlt, Donders, Jaeger, Snellen, Smee, Green, and many others, furnishes most interesting reading. The literature on the subject is voluminous. Any attempt to even enumerate simply principles devised would occupy much space and would be manifestly out of place in an article of this kind. A most exhaustive series of articles on the subject have recently been written by Pergens (*Annales d'Oculistique*, 1906-7).

Strange as it may seem, the vision test charts in present use give a very imperfect indication of the visual acuity actually present in any given case, mainly from the fact that the size and style of the test letters vary considerably and also because no two letters in the alphabet are seen with equal distinctness, or better, under the same visual angle.

To obviate this latter defect several charts have been devised having objects other than letters for the patient to read or count, as the disks of Striedenger (*Statistical and Sanitary Report*, 1860), or the broken circles of Landolt (*Graefe's Arch. f. Oph. Bd., LXIV*).

Although these schemes have considerable theoretical value, their disadvantages overbalance their advantages and would hardly be sufficiently practical for our use in the navy.

So-called Snellen's charts are in general use the world over, yet it is impossible to obtain an original Snellen's chart in this country. The charts sold as Snellen's, which are everywhere seen, are constructed more or less closely in conformity to his principles, but with the letters varying materially in size and shape according to the ideas of the numerous publishers.

To illustrate, the writer has collected over 30 different test charts published and used in the United States, and after careful measurement it was found that the size of the letters, which should be seen at the distance indicated on each line, did not correspond in any two charts. Considering the line of letters which should be seen at 20 feet (20/20 line) there was a variation in the size of these letters on different charts from 7.4 mm. square as a minimum to 10.6 mm. square as a maximum. As we do most of our work in the navy with the 20/20 line, one can readily see that it would make a vast difference to a candidate, slightly defective in vision, who was desirous of entering one of the various corps, whether he was tested by a chart with the letters constructed according to the former or latter measurement. Yet this is taking place every day. Many of our test cards which are furnished by different optical firms vary so much in respect to the size of the letters that the acceptance or rejection of a candidate may, and often will, depend upon the particular test card used. This also accounts, in a measure, for the discrepancy in the visual acuity as determined by medical officers in the navy from the result that the candidate obtains from a physician in civil life.

Snellen found that a letter which subtended an angle vertically and horizontally of five minutes (the component line of the same subtending an angle of one minute) at the nodal point of the eye was a fair test for the determination of normal visual acuity. This is known as Snellen's principle. He also stated that many persons have a far greater vision than this, and that this measurement represented only the minimum average vision; and that if the person examined did not have at least this amount of vision he could not be considered as having normal eyesight.

This is generally accepted as the standard in the manufacture of test letters in all civilized countries, and one would at first think that there was no excuse in not having the letters on charts of different manufacturers of such size as would conform with this principle, providing his plan was to be followed. But we are at once confronted with the problem: Shall we construct our letters as if measured on the chord or tangent of the angle of five minutes, or shall we do as has been recommended in this country—strike a mean and use twice the

tangent of half the angle of five minutes? It will be readily seen that the size of the letters will vary according to the method we select. Snellen's original charts vary themselves in the size of the letters and as he has published several different styles of charts, we can not construct a similar chart ourselves unless we are informed as to exactly which one we are to select for our guide.

The lack of uniformity in the size of the test letters used in the navy is unfortunate as it produces inconsistent records. We, at least, should be consistent with ourselves and have a uniform standard in the size of the letters used. The new card submitted has this as one of its objects.

As the Navy Regulations require that Snellen's principles should be followed, a series of test letters have been constructed which will subtend an angle of 5 minutes vertically and horizontally, at the nodal point of the eye according to the distance indicated. The letters are drawn on a plane representing $2 \tan \frac{1}{2} 5'$, this being the measurement generally used.

$$\begin{aligned}\text{Example: } 2 \tan \frac{1}{2} 5' &= .0014544. \\ 20 \text{ feet} &= 6093 \text{ mm.} \\ .0014544 \times 6093 &= 8.83 \text{ mm. (for the 20/20 line).}\end{aligned}$$

Therefore the letters should be about 8.8 mm. square and the new test charts have been constructed on this measurement. The lines of the letters have been drawn of such width that they will subtend an angle of 1 minute, thereby fulfilling Snellen's principle.

As long as we in the United States Navy use the line of letters which should be normally seen at 20 feet as the basis of our visual measurement, it is not necessary to have letters which should be seen at greater distances. It is of little advantage in a navy recruiting office to require the applicant to read all the larger letters usually found on test charts with each eye; in fact it is a waste of time. The question is—can he read the 20/20 line of letters at 20 feet; if not, at what distance can he read them? Consequently, in the proposed test chart, all of the larger letters are omitted.

For the purpose of recording better vision, as for example, among our gun pointers when 20/15 vision is required in the sighting eye, additional lines of letters proportionately smaller, have been constructed all in conformity to the above-mentioned principle. It might be added that all the letters were first drawn as accurately as possible on paper twice the required size and then photographed at one-half the size to reduce the chance of slight errors. From the negative a copperplate was made with unusual care to insure clean-cut edges and perfect alignment of the letters. The gothic type is recommended. (Fig. 2.) The block type (fig. 1) has been used for about two years, but is for our purpose in many ways not as satisfactory.

The illumination.—Doubtless diffuse sunlight would come the nearest to an ideal illuminant, but it is not practicable, as it varies in intensity through too wide ranges, and obviously is not at our command.

Artificial illumination is imperative and should be of such quantity as to well illuminate the cards. Oguchi ^a states that the measurement of visual acuity depends upon the amount of light used, and that the ability to read a test chart decreases proportionately to the cube root of a diminishing light intensity. It has been found that a light of between 30 and 50 meter candles gives the best results. With a long test chart, such as is in general use, it is difficult to evenly illuminate it unless the O'Brion light is installed. In the accompanying illustration it will be seen that the bracket is so arranged as to increase or decrease the intensity of the light as the operator desires. This can be done within certain limits which is sufficient. A 32-candlepower filament electric light is now used, and when an electric current is available a steady and ample illumination of the card can always be obtained, which is very essential to insure accurate and consistent results.

The desirability of having a chart that eliminates the possibility of the candidate being able to learn the letters either intentionally or unconsciously is apparent. Any intelligent person who reads the 20/20 line at 20 feet with one eye unconsciously for the moment partially memorizes the letters and uses the knowledge so gained to aid him in reading with the other eye; if the other eye happens to be defective an erroneous interpretation of his visual acuity results, and if the letters are memorized intentionally an accurate result of the real vision is not obtained. Memorization of the ordinary test charts is not a difficult matter. With practice and study almost any number can be learned, and provided the reader can read the larger letters at the top of the card, he is able to give all those remaining. In the case of a candidate who nearly but not quite meets the requirements for the navy, the learning of a single line is enough to enable him to pass successfully, and when considerable depends upon meeting the visual test the temptation to memorize the letters is great. That this is done is known to almost every medical officer, and with our present methods of testing vision, the examiner is never sure whether previous knowledge of the card has entered into his determination or not.

A suggestion might be made that we keep our charts under lock and key when not in actual use or have a chart made that would not be found in general use, but even with these precautions others besides the medical examiner necessarily would have access to them

^a Arch. f. Oph. Bd. LXVI-III.



FIG. 1. BLOCK TYPE.

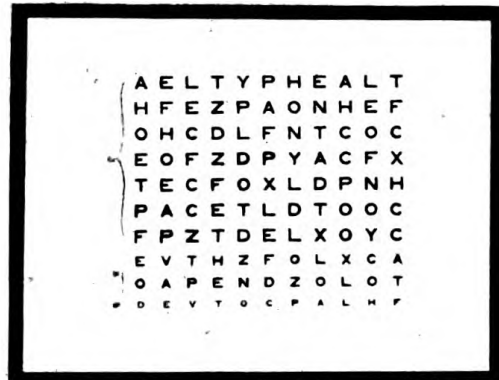


FIG. 2. GOTHIC TYPE.

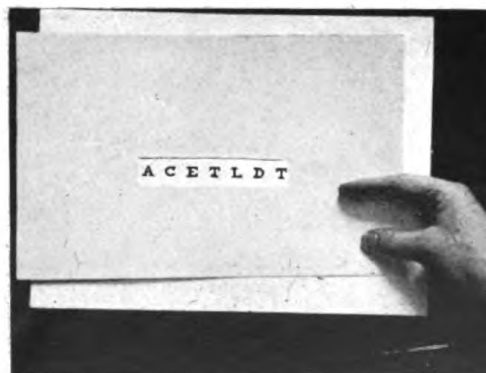


FIG. 3. HAND METHOD OF USING THE CHART.

"UNLEARNABLE" VISION TEST CARD—GROW.

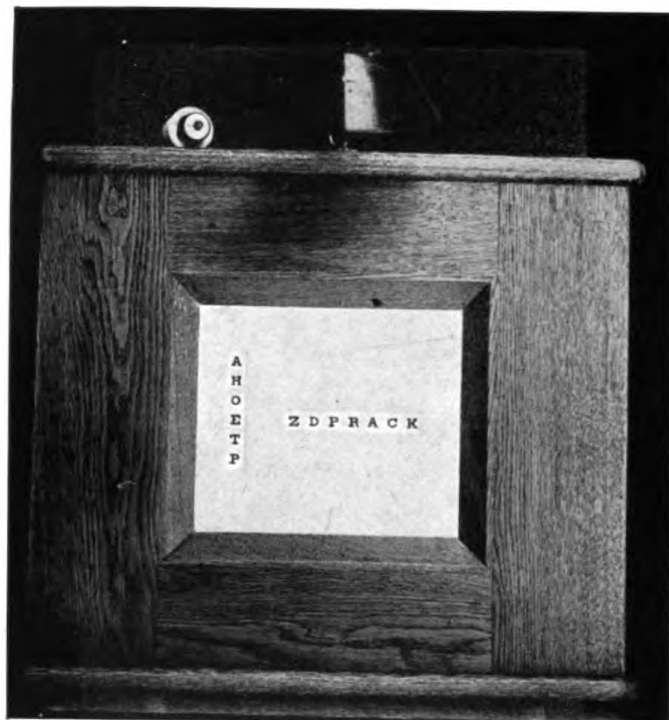


FIG. 4. FRONT VIEW.

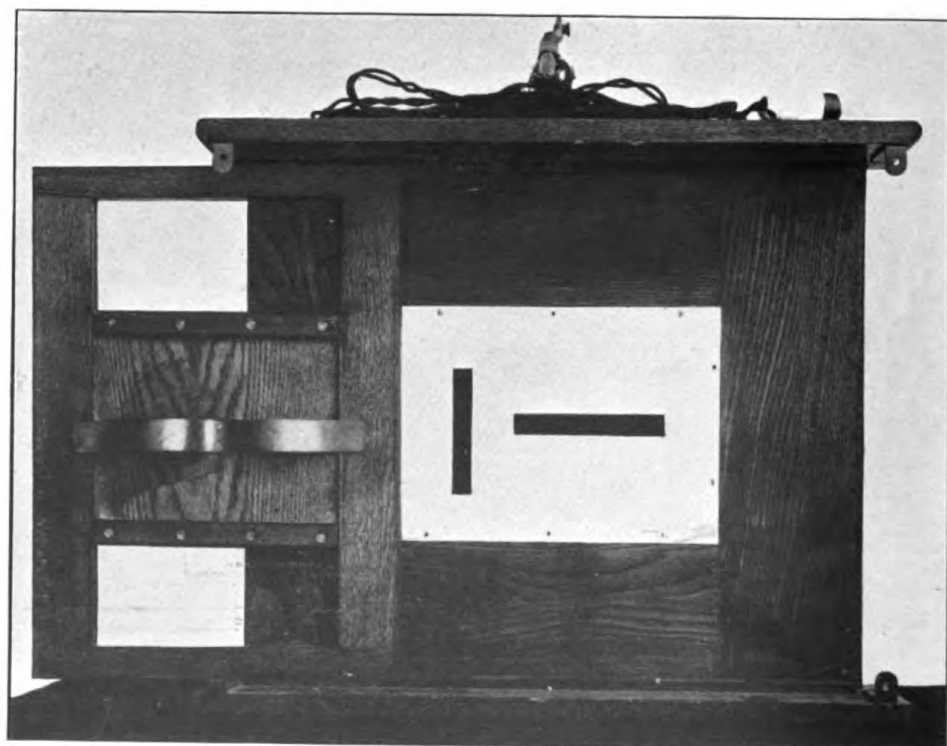


FIG. 5. REAR VIEW.

"UNLEARNABLE" VISION TEST CARD—GROW.

and soon be familiar with the "special chart" and before long the secret would be out. (This has been tried.)

Inasmuch as we rely principally on the candidate reading the 20-foot line, it might be suggested that the ordinary test card could be used, having a rider with a slot in it sufficiently large to show only one letter at a time and by moving the rider back and forth successive letters are presented at random, thus precluding the possibility of taking advantage of previous memorizing of the letters. An excellent idea, providing all the remaining layer letters on the chart are covered at the same time, but if, as is generally the case when this method is used, the next line above is seen in its entirety, the candidate, if his vision is not too low, can read the letters in the slot, even if he does not see them, by learning the position of the slot with reference to the layer letters above which he does see.

The writer had a case of a bugler, 15 years old, who could read the letters presenting in the slot, even though the slot was covered by a piece of paper. He did this by first having learned the position that each letter bears with reference to the lines above which he could see.

It is astonishing to what extremes some candidates will go to enable them to pass the visual requirements, especially when a life occupation is at stake, simply because they lacked, by 3 or 4 feet, the ability to read the test letters at the required distance.

By the method generally in use the medical examiner is never certain whether the candidate has learned the letters or not, and his first suspicion may be aroused by receiving a letter from the bureau announcing the fact that so and so, whom he passed a month previously, has been surveyed and discharged from the service on account of defective vision, existing prior to enlistment.

The new chart proposed is constructed with a view to eliminate this constant source of error. The chart shown (figs. 4 and 5) is made with the idea of securing:

First. Uniform test letters (Snellen's).

Second. Adequate illumination.

Third. An "unlearnable" set of letters.

A glance at the illustrations will show the method in which the test card is operated. The frame which supports the bracket holding the electric light is not absolutely necessary but is a great convenience, for various groups of letters which are thrown into view are always under the same illumination. The operator does not know the letters presenting until he observes them himself. The candidate under examination has no guide to assist him and if he reads the letters presenting correctly he must see them. The numerous combinations or groups of letters which can be instantly thrown into view are too many for him to memorize, and although he may

learn every letter on the card in their sequence, that knowledge would be valueless when the test is applied, for he reads only the letters which the operator throws into position and he can not pronounce them unless he actually sees them, which is the object desired. In other words, the candidate can have possession of the chart and any knowledge he can gain thereby will be of no assistance in aiding him to deceive as to his actual visual acuity.

For traveling recruiting parties and for use aboard ship the bare card is sufficient. Take a piece of white blotting paper, cut a slot in it of sufficient length and width as will show as many letters as desired, place it over the test card and it will be found that over a hundred combinations of letters can thus quickly be exposed for observation (fig. 3).

The question of illumination in this case must be solved individually. The card should be placed in diffused sunlight if possible, or if this is impracticable, the best artificial illumination at hand must be used.

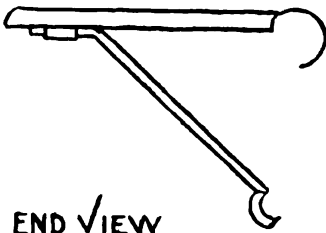
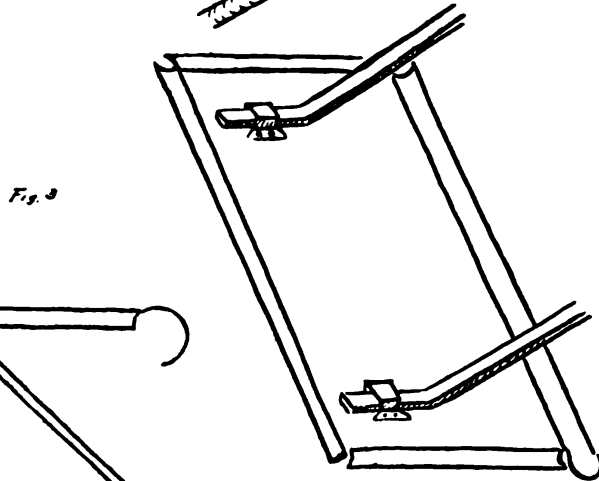
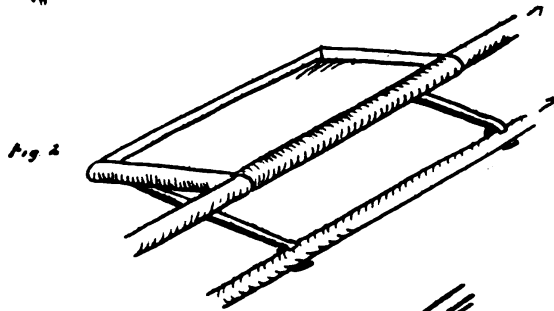
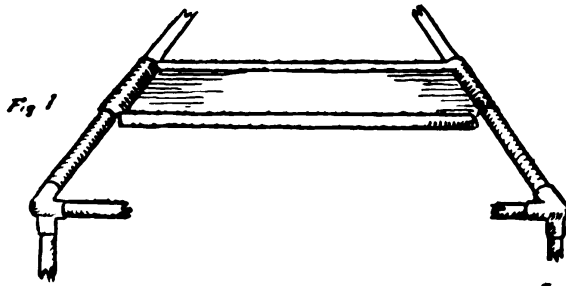
This chart has been in use over two years and has proved satisfactory.

A SUGGESTED BUNK TRAY.

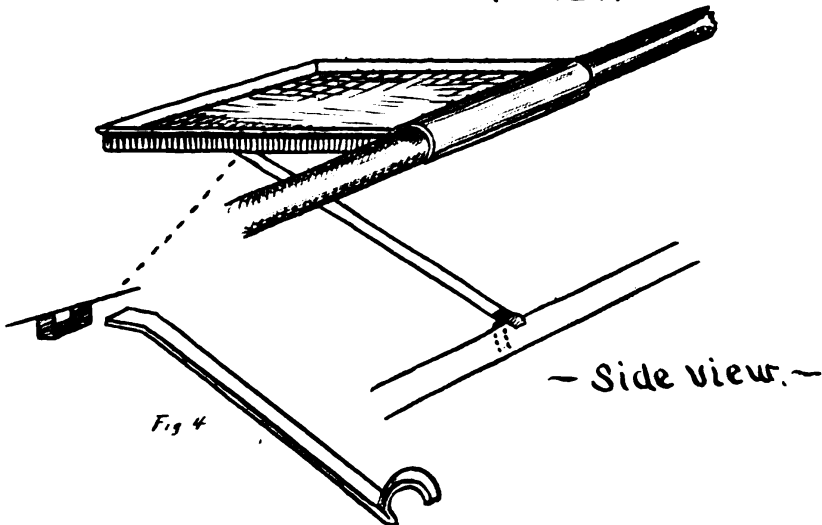
By Surg. G. F. FREEMAN, U. S. Navy.

A bunk-side dressing tray, which is quickly detachable, and can also be used as a tray across the upper pipes of a sick-bay bunk, has been found so practicable and useful that a description with photographs and diagrams is given.

In the sick bay as found on board the U. S. S. *Montana* on going into commission many little contrivances were found to be absent which are convenient and at times necessary. One want that was especially felt was a small tray that could be attached to the side of the bunk, on which could be placed basin for ice compresses in eye cases, feeding cups, etc. In the lower bunks these articles could be placed in chairs, or even had to be put on deck. In the upper bunks the only convenience was a hook on which a sputum cup could be hung. It is also often necessary to do a dressing at the bunk side, and sometimes to open abscesses, etc., as severe tonsillar abscesses, the patients being very weak. Many times also delirious alcoholics with scalp wounds have to be restrained in bunk and dressed there. In all these cases some bedside tray for dressings and instruments was desired. This tray could also be used for dishes, etc., being sufficiently large. Again a tray to go across the bunk was often convenient, serving as a receptacle for dishes and also books, writing materials, etc., by convalescing patients. The above three necessities



BOTTOM VIEW



BUNK TRAY—FREEMAN.



PLATE I.



PLATE II.

BUNK TRAY—FREEMAN.

The first thing I noticed
 when I stepped out of the car
 was the cold, crisp air.
 It felt like a fresh blanket.
 The sun was shining brightly,
 and the birds were singing.
 It was a beautiful day.
 I took a deep breath.
 The air smelled so good.
 I had never smelled it before.
 It was like a new world.
 I had found it.
 I was home.

The first thing I noticed
 as I stepped out of the car
 was the cold, crisp air.
 It felt like a fresh blanket.
 The sun was shining brightly,
 and the birds were singing.
 It was a beautiful day.
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 was the cold, crisp air.
 It felt like a fresh blanket.
 The sun was shining brightly,
 and the birds were singing.
 It was a beautiful day.
 I took a deep breath.
 The air smelled so good.
 I had never smelled it before.
 It was like a new world.
 I had found it.
 I was home.

In brief, these trays are simply sheets of copper molded to fit the bunk, with braces added to support the tray. The idea and plan was thought of, but the coppersmith on board perfected the suggestions, and, being much interested, was invaluable in producing a simple but efficient apparatus.

Since these trays have been in use several improvements have been thought of, as some reenforcement, as an extra strip lengthwise in large tray; ring locks at the rolled ends and sides, to secure these rolled pipes to sides of bunks; also two detachable braces at the sides of trays away from patient, when tray is across bunk, to tilt tray at an angle for reading, etc. It is considered, however, that these would detract from the simplicity, and were not advisable, unless some such apparatus could be furnished as part of the sick-bay equipment, when some form of dressing or bunk tray could be perfected.

As the above device was simple, and has proved its usefulness after a fair trial, it is submitted for consideration. It has been a great convenience to medical officers and a comfort to patients. These trays can easily be disinfected and kept clean and add much to the apparent equipment of the sick bay.

CLINICAL NOTES.

REPORT OF TWO CASES OF CEREBRO-SPINAL FEVER.

By Passed Asst. Surg. J. B. KAUFMAN, U. S. Navy.

The high mortality in certain epidemics of cerebro-spinal meningitis warrants the following report of two cases, wherein the Flexner-Jobling serum was used with favorable results and may excuse the writer for venturing an opinion which he believes may be worth recognition. The value of early serum injection stood out so boldly in these cases that to ignore a report of them would be an injustice, to say the least, to those who have been and are now devoting their time toward perfecting a serum capable of neutralizing the toxins of the meningococcus.

The cases were treated at the United States Naval Training Station, San Francisco, Cal., the record being as follows:

Case No. 1.—H. N. S., apprentice seaman, age 17 years.

Taken suddenly ill May 28, 1909, at 7 a. m., at which time it was reported that he was seen falling out of his hammock and when picked up was unconscious. He was referred to the hospital at once as a suspect. When examined one hour later, the following symptoms were noted: Conjunctivæ heavily injected, retraction of the head and stiffness of neck muscles marked, the petechial eruption on the back and legs unmistakable, Kernig's sign positive, and the patient wildly delirious, though in fleeting lucid intervals he would beg for something to relieve his head, indicating the pain by placing his palms upon his forehead.

The axillary temperature at this time was 95.4° and the pulse, while slow, was almost indistinguishable at the wrist. Lumbar puncture was immediately decided upon and 60 c. c. of turbid fluid removed from the canal, it being necessary to clear the needle from time to time to promote the flow. The first few drops obtained were immediately examined with a positive report for meningococci, and immediately 40 c. c. of serum was introduced into the canal. Following the injection of the serum, and before the needle was withdrawn, the patient became so quiet, in contradistinction to the extreme restlessness preceding, that it was feared a fatal termination had ensued. Instead of this, he seemed to have passed into a deep sleep, from which he was aroused, and upon asking him how his head felt, responded, "Much better." He slept for three hours, and upon awakening complained of a slight frontal headache; the muscular rigidity was much lessened, and, while he was still slightly restless, his condition was

markedly improved. After midnight to the following morning he slept undisturbed and without the aid of opiates. When he awoke the following morning his mind was perfectly clear, most of the muscular rigidity had disappeared, and he progressed rapidly to absolute recovery.

Case No. 2.—H. A. H., apprentice seaman, age 19 years.

Admitted June 28, 1909, at 6.30 p. m., was perfectly conscious and complained of rather severe frontal headache, temperature 102.4° . There was apparently no muscular rigidity, Kernig's sign was wanting, and yet he was regarded as suspicious. At 8 p. m. he suddenly became wildly delirious, temperature dropped to 98.4° by axilla, and radial pulse was indistinguishable. At this time all the symptoms noted in the first case were present and, as it was manifestly impossible to do a lumbar puncture with the patient so extremely restless, a small amount of ether and chloroform was administered (after 1/20 grain strychnine sulphate had been given hypodermically), 60 c. c. of cerebro-spinal fluid was then removed with difficulty, it being necessary to aspirate the thick, ropy, purulent-looking fluid; later this was examined and found positive for meningococci. Immediately 40 c. c. of serum was injected.

It was deemed advisable to give the patient hypodermically $\frac{1}{4}$ grain morphine sulphate with 1/100 grain atropine sulphate, a procedure which I do not think now was at all necessary. The patient rested well that night, the pulse was full and strong and, while he vomited once during the night, he was conscious at 7 a. m. the following morning; said he felt better, but still complained of severe pain in the head. He vomited several times during the day but seemed generally to be improving. On the next day, however, the frontal and occipital head pains seemed much worse, the restlessness was increased, and the mental condition less clear, so that at 8 p. m. (forty-eight hours after first puncture), it was deemed advisable to retap the spinal canal. Forty-five c. c. of fluid was removed, which was fairly clear, flowed without difficulty, and contained only an occasional meningococcus. Thirty c. c. of serum was injected and when the needle was withdrawn the patient was absolutely quiet and informed the writer that he had no pain in the head, although the back of his thighs were slightly sore. Thenceforth he improved rapidly and was returned to duty cured.

The diagnosis in both of these cases was made early, in neither case more than six hours after the onset of symptoms, and immediately lumbar puncture was performed. While no one will question the advantage of the earliest treatment possible in these cases regardless of the particular treatment we advocate, yet the writer wishes to emphasize the belief that this is particularly true where serum treatment is used.

It will be seen that in both of these cases a much smaller quantity of serum was injected than cerebro-spinal fluid withdrawn and the immediate result following this procedure proved so satisfactory that we feel justified in emphasizing this method.

Believing as we do that the head symptoms are as much the result of an increased pressure within the canal as they are to the direct toxic effect of the organism, and as in most cases this mechanical condition is but an expression of an excess in the quantity of cerebro-spinal fluid, the introduction of an amount of serum equal to that of fluid withdrawn appeals to us as unwise, if not irrational. In each

of these cases after 30 c. c. of fluid had been removed the patient seemed to suffer with more intense pain in the head, which seemingly increased as more was withdrawn, but which to even a more marked degree was relieved by the introduction of the first 10 c. c. of the serum.

As a result of this limited experience our basis of procedure, roughly speaking, is to remove at least 60 c. c. of fluid where possible at the first puncture, and never to introduce of serum more than two-thirds of the quantity of fluid removed.

As to increasingly severe headache that ensues we feel certain that as the rapidity of our technique improves (not the rapid introduction of serum, but its early introduction after the terminal portion of fluid has been removed) we shall reduce the time of that symptom's presence.

As to the question of repeated puncture, it will be seen that in case No. 1 there was a gradual diminution in all symptoms, and we did not feel justified in again withdrawing fluid, but in case No. 2 the patient had again reached that stage where he complained severely of frontal headache, was extremely restless, subconscious, vomiting increasing, etc., so that we not only felt that a repeated puncture and injection was justified, but imperative. The resulting condition was proof positive that in this case, at least, our method was right. We are fully aware that the seriousness of cerebro-spinal epidemics varies even as in other infectious diseases of less grave significance, but since the disease in its incipency gives no warning note as to its gravity we can but conjecture upon the gravity of a given epidemic. We believe therefore in the use of the serum as outlined above in each case where the diplococci are demonstrated, but do not believe that the injection should be repeated at regular intervals regardless of the patient's condition. The interval should be determined by closely observing the case from time to time and repeating the injection where gradual improvement is markedly interrupted or sudden serious symptoms intervene.

The writer has purposely refrained from reporting these cases earlier by reason of the fact that he had thought to present a greater number of cases and thus submit his conclusions in a less apologetic manner, but such have not presented themselves, and he offers these notes as a mere report, and adds thereto his profound belief in the undoubted value of the present Flexner-Jobling serum in all cases of cerebro-spinal meningitis when used early and in the relative doses herein advocated.

ACUTE EAR DISEASES FOLLOWING SWIMMING.

By Asst. Surg. L. M. SCHMIDT, U. S. Navy.

During the time that the Atlantic Fleet spent at Guantanamo Bay early in the present year, a large number of acute ear diseases were admitted or referred to the hospital ship for treatment. Of these, at least half of the number had swimming as the direct causative factor.

While all the cases to be described here were due to swimming, the different mode of operation of this etiologic factor produced three distinct diseases, each with its own pathology, symptomatology, and treatment. Although these cases at their inception were of a mild nature, and the prognosis ordinarily good, neglect of appropriate treatment would early result in a suppurative *otitis media* and a possibility of any of the dangerous complications of this latter disease. Indeed, the majority of cases were sent to the hospital ship with a diagnosis of *otitis media*, so serious and severe had the symptoms become, and two cases actually had middle ear involvement.

So it would seem of great importance to diagnose accurately and treat promptly these cases of ear trouble following swimming. If this is done, recovery is usually prompt and hearing is restored almost without exception.

The three classes of ear disturbances will be considered separately, citing cases for purposes of illustration.

I. *Occlusion by impacted cerumen*.—These are cases in which masses of inspissated cerumen are present in the external auditory canal, but in such amounts as to ordinarily produce no symptoms. Water, entering the ear while swimming, causes the mass to swell, produces pressure upon the walls of the canal, and obstructs sound. The swimmer, upon leaving the water, notices slight deafness in the affected ear and feels as though a bubble of water had remained in the ear. Pain does not come on at once, but usually in from ten to twenty-four hours. By this time the pressure of the mass in the canal has caused maceration of the epithelium and infection is introduced.

With the pain, or shortly after it begins, a thin watery discharge, scanty at first, and then becoming more abundant and purulent flows from the meatus. The following is a typical case:

Case I.—J. F. T., seaman, admitted March 23, 1910, as with *otitis media*. History: Ten days before, after coming out from swimming, patient noticed a dull sensation in left ear, as if the ear were filled with water. The following day there was pain in the ear, which toward night became very severe and was accompanied by a slight discharge. The drum was said to have been incised at this time, but produced no relief. The pain and discharge persisted to time of admission, or about eight days. The temperature at all times was normal. Examination, upon admission, showed the auditory canal filled with a dark-brown mass, which was removed with forceps and proved to be impacted

cerumen. After irrigating the canal, the lining membrane and drum were seen to be considerably injected. No further treatment was given, and after four days local examination showed about normal appearances and normal hearing. Patient was discharged to duty on the sixth day.

Often, if relief is not given early, the walls of the canal swell until they almost obliterate the meatus, thus making deep examination impossible and treatment very difficult. Such conditions are shown in the following cases:

Case II.—J. J. D., seaman, admitted to U. S. S. *Solace* on March 15, 1910, as with *otitis media*. History: Six days before, after swimming, patient noticed that on leaving the water he was deaf in the left ear. That night pain began in the ear and became severe. The next morning a free discharge of pus flowed from the auditory canal. Pain and discharge had been constant up to time of admission. Examination: Temperature 102° , but this was probably due to coexisting tonsillitis which had had its onset the previous day. Locally there was considerable pus blocking the meatus which was narrowed almost to occlusion by swelling of the walls of the canal. The canal was irrigated with hot solution several times before the decomposed pieces of cerumen were brought out. The following day the purulent discharge had ceased, the swelling of the canal had subsided, and there was freedom from pain. Examination of the drum was made and showed the membrane greatly injected but with no visible perforation. Recovery was prompt and complete and patient returned to duty in six days.

Case III.—H. E. W., admitted to the U. S. S. *Solace* on March 5, 1910, as with *abscessus* (right ear). History: One week before, after swimming, patient complained of earache. This increased in severity and was accompanied by deafness in the affected ear. For two nights prior to admission sleep had been impossible because of the pain. Examination: Walls of right external auditory canal were swollen so as to prevent deep examination. Slightest manipulation of the external ear caused great pain. Patient was given frequent hot formalin irrigations which, on the second day of treatment, brought away masses of cerumen and prompt relief from pain and deafness followed.

If, in these cases, the auditory canal is not emptied, the swelling of the lining membrane becomes extreme and obstructs drainage. The decomposing and infected contents lie against the tympanic membrane which eventually perforates and a true *otitis media* is established. After this, it would be impossible, without the history, to tell whether the condition of the external canal were primary or secondary to the *otitis media*.

Diagnosis: This is easily made from the characteristic sequence of symptoms: (1) The sensation of dullness in the ear immediately upon leaving the water; (2) pain occurring after from ten to twenty-four hours; (3) the thin, watery discharge usually coming on with the pain and later becoming purulent; (4) absence of fever, unless complicated. In Case II, the temperature of 102° was due to tonsillitis. (5) Local examination, when made before too great swelling, leaves no doubt as to the condition.

Treatment: This, of course, is simple when instituted early and consists only of removing the irritating and occluding material from

the ear. If the case is seen late, the swelling of the canal can be reduced by irrigations of hot formalin solution (1-4000), after which the cerumen can be removed. If pain is severe, and it usually is after the third or fourth day, in untreated cases, this can be relieved by instilling, after the hot irrigation, one drop of equal parts of cocaine, chloral and carbolic acid. After the canal is cleansed, if there is much inflammation of the lining tissues, this requires some non-irritating antiseptic dusting powder, such as boric acid. Sometimes a small pustule or bleb is seen on the tympanic membrane and this should be opened or perforation may result.

II. *Otomycosis*.—While infection of the external auditory canal by molds is not necessarily contracted in the water, a number of cases seen attributed their trouble to swimming and it is reasonable to suppose that the spores were carried into the ear while diving. The conditions in the ear would furnish an ideal place for the growth of molds. Two varieties were found, the *Penicilium* and the *Aspergillus*.

Symptoms: These varied a great deal. In some the first symptom noticed was deafness, gradually increasing. Others complained of pain of a severe character as the first sign of trouble in the ear. About half of the patients had a purulent discharge when first seen and some of these were sent to the hospital ship as with *otitis media*. A case of the mild, insidious type is the following:

Case I.—F. J. T., C. P., came under observation while being treated for gonorrheal arthritis. About three weeks before, after swimming exercises, patient noted deafness in the left ear. This soon passed away. During the past two weeks the deafness had come on again and progressed rapidly. There were no unusual noises in the ear. Examination showed the canal blocked by a grayish mass upon which could be seen small black bodies like sprinkled pepper. A culture was made of this and it proved to be the *Aspergillus niger*. The growth was removed from the ear by instruments and irrigation and it was found that the fungus was implanted upon a mass of inspissated cerumen. The canal was then dusted with boric acid.

On the other hand, the sudden onset and severe pain may suggest a much more serious condition and, indeed, these cases have perforated the tympanum and invaded the middle ear.

Case II.—W. H. H., ch. yeoman, admitted to U. S. S. *Solace* on March 14, 1910, with *otitis media*. Patient had had trouble with left ear about six months before, during target practice, and this was thought to be a return of the old trouble. Four days before admission, pain occurred in the left ear. Within a short time there was pain and swelling over the tip of the mastoid and below the auditory canal. There was a purulent discharge from the meatus. The wall of the external auditory canal was swollen so as to almost block the orifice, and patient was entirely deaf in this ear. Some whitish material was secured from the canal and examination showed several kinds of bacteria, together with the *Penicilium*. Hot formalin irrigations were given, followed by instillations of 1-10,000 solution of bichloride in alcohol. Improvement was rapid and patient was discharged with normal hearing on the fifth day.

Diagnosis: The local findings in otomycosis vary with the variety of fungus. Sometimes the small pepper-like granules sprinkled on the walls of the auditory canal make an immediate diagnosis easy. Other cases show the walls covered with moist white granular material like heaped up epithelium. This can be easily removed and a diagnosis accurately made under the microscope.

Treatment: This consists of cleansing the canal as well as possible and destroying any remaining spores. Sometimes the walls are so swollen that deep irrigations are impossible, in which case external irrigations with hot solutions soon reduce the swelling. Bichloride of mercury 1 part in 10,000 parts of alcohol usually destroys the spores. If the walls of the canal are badly inflamed, the alcoholic solution causes too great pain and, if such is the case, boric acid powder, blown into the ear, is equally efficacious.

III. *Salpingitis.*—These cases are like the ordinary cases of catarrhal inflammation of the eustachian tube, except in the peculiar manner in which the affection originates. In deep diving or in swimming long distances under water the air, which has been held in the lungs, is, after a time, forcibly expelled from the lungs by the chest muscles and momentarily raises the air pressure in the upper air passages. At this moment air frequently passes into the eustachian tubes and middle-ear cavities. If there is any amount of secretion in the nasopharynx, this is carried into the tube, or even into the middle ear, where a catarrhal process is established.

Symptoms: Usually, at the time that air and secretion are forced into the tubes, the person is conscious of a bubbling, blowing, or clicking noise. On coming to the surface of the water there is a sense of fullness in the ear, with ringing or buzzing sounds. The voice may sound as if one spoke into a barrel. Loud clicking is heard during the act of swallowing. These symptoms may abate after a few hours, or may persist as above described, or may increase to those of a true *otitis media*. More commonly they persist as slight deafness, with tinnitus. The following case is typical and occurred from holding the breath, although not under water:

Case I.—W. H. R., examined as an out patient on March 16, 1910. About ten days before patient had, while in swimming, tried to see how long he could hold his breath. Toward the end of one of these trials he noticed a clicking, followed by ringing, in both ears. After leaving the water the acuity of hearing seemed decreased and the voice sounded hollow. From then until time of examination patient was troubled with slight deafness and with humming and buzzing noises in the ears. Examination showed both ear drums retracted. Both middle ears were inflated through a eustachian catheter. The noises in the ears promptly ceased, but there was no improvement in the hearing at the time. This was the only time this case was seen, but the doctor from the patient's ship stated that within a short time all symptoms had subsided.

Diagnosis: The history and the examination make the diagnosis clear. By the time the patient comes to examination there is con-

siderable retraction of the drum. If there is some catarrhal *otitis media* associated, the secretion, which can not pass through the eustachian tube, may be seen through an almost normal tympanic membrane. Posterior rhinoscopy shows a swollen hyperæmic condition about the eustachian orifice.

Treatment: This aims to restore the patulency of the eustachian tube and to correct any abnormal condition of the nasopharynx.

After gently cleansing the nasopharynx with a warm alkaline antiseptic solution, inflation of the eustachian tube may be tried by Politzer's method. This failing, the eustachian catheter is passed and air or chloroform vapor blown gently into the tube. Immediate relief is given to tinnitus and all symptoms usually subside after a few treatments. Of course, if the exudate in the middle ear becomes purulent a free incision in the drum should be made. It is important that the treatment of the tubal catarrh be prompt or a chronic thickening of the walls, not only of the eustachian tube, but of the middle ear, may result.

DIRECT TRANSFUSION OF BLOOD IN A CASE OF SHOCK AND HEMORRHAGE.

By Surg. R. B. WILLIAMS, U. S. Navy.

On April 23, 1910, while C. A. B., seaman, aet. 24, was at drill in the lower handling room of No. 1 turret of the U. S. S. *South Carolina* removing dummy powder bags from the ammunition car, the car was suddenly started from above. The left arm was jerked away, but the right was caught between the car and the margin of the trunk leading to the upper handling room into which the car closely fits. The arm was completely severed from the body inside the shoulder joint, the entire right upper extremity with the outer third of the clavicle, the outer third or more of the scapula, and large masses of the scapula and pectoral groups of muscles were completely separated from the body.

The man did not fall nor was he immediately conscious of pain or aware of the fact that his arm had been lost until he saw it lying on the shell table.

The open and spurting axillary artery was compressed in the wound by another member of the turret crew until a medical officer who was in the dispensary at the time of the accident reached the scene. Hæmostats were put upon the artery, oozing was controlled by gauze pressure and temporary dressings were applied, and the injured man was placed in the splint stretcher and hoisted vertically through three decks and narrow hatches and taken to the operating room. This was accomplished without difficulty with the "Stokes" stretcher, but would have been a most difficult undertaking without the aid of this excellent device.

Under ether the artery was doubly tied with chromic gut, the vein which had stripped out for 4 or 5 inches was ligated and cut away. The nerves which, as is often seen in cases of avulsion of limbs, were hanging from the wound and some of the cords a foot or more in length were pulled down and cut off. Rough bone ends were smoothed off, and the torn masses of scapula and pectoral muscles were approximated with sutures. The skin was trimmed and sutured and large iodoform gauze drains inserted.

The chest wall was severely contused and abraded and at several points over the ribs small wounds seemed to indicate that a fractured rib might have penetrated the skin.

During the operation hot coffee and normal salt solution was given per rectum, salt with adrenalin (4 c. c. of 1-1,000 solution to 1 liter of normal salt solution) was allowed to flow beneath the skin of the breast. Atropin sulphate 1/100 grain was given hypodermatically.

The anæsthetic was recovered from promptly.

About eight hours after the operation the symptoms of shock began to be more marked than at any time since the accident. The pulse was 180 or above, small and compressible, and the expression was bad. Under these circumstances it was believed that a transfusion offered the only hope of recovery.

As the entire turret crew had volunteered, a donor was easily obtained. The more difficult proposition was to improvise the necessary appliances. A Brewer's glass cannula was made by bending and drawing out the ends of a straight piece of glass tubing. A boat was sent ashore to Provincetown for paraffin as there was none on board.

Preparation was made for doing the transfusion without removing the patient from his bed. The operating table on which the donor was to lie was taken to the bedside. The glass tube was dipped into the melted paraffin and then shaken so that the inside of the tube would be coated with paraffin and its lumen not obstructed.

The right radial artery of the donor was exposed at the wrist and dissected free from its surroundings for an inch or perhaps a little more. A large vein on the inner side of the left elbow of the recipient was exposed. The artery was ligated below, and above it was compressed by a small hæmostat, whose blades had been guarded by slipping over them pieces of a rubber catheter. Only sufficient pressure was made to compress the lumen of the vessel. The artery was next cut across with sharp scissors, near the ligature.

The artery had so contracted by exposure to the air that it seemed impossible to get the end of the Brewer's tube into it, but by pulling down and cutting off the adventitia, as suggested by Carrel, and by inserting a pair of fine iris forceps into the end of the vessel and separating the blades the lumen of the vessel was so dilated that the end

of the glass tube could be inserted into it, and a ligature was tied around it to hold it in place.

With scissors an oblique cut was made into the vein exactly as one would do in doing a saline transfusion, the vein having first been ligated below. The hæmostat was then removed from the artery, and with the blood flowing from the open end of the tube, this end was quickly inserted into the opening in the vein and held in place there by a ligature surrounding the vein. The wrist of the donor and the elbow of the recipient had, of course, to be closely approximated.

The necessary dissections of the artery and vein were done under one-half per cent cocaine solution.

It was immediately apparent that transfusion was being perfectly accomplished. The pulse of the donor could be felt in the cephalic vein of the recipient in the middle of the arm, and blood could be seen to flow through the tube at each pulsation of the donor's radial. When transfusion had been going on for about fifteen minutes, owing to the restlessness of both patients, the end of the tube slipped out of the vein. Without stopping the flow of blood from the tube, for to do so would invite clotting in the tube, the tube was again inserted into the opening in the vein and the transfusion continued. The blood was permitted to flow from donor to recipient for forty-two minutes. Toward the end of this period the donor began to show some signs of loss of blood, such as slight pallor, slightly increased pulse rate (although the pulse never went above 74), and complained of thirst and weakness.

During the transfusion a remarkable change took place in the condition of the patient. The pulse fell from above 180 to 126, the face filled out, the color became good and the lips red. The man looked almost ruddy. The sweating ceased and the voice was strong. All symptoms of shock had disappeared.

When it was decided to stop the transfusion the artery was caught above the end of the tube with a hemostat, the vessel ligated with catgut and wound closed with a subcuticular. The vein was also ligated and the wound closed with interrupted sutures.

Recovery was uneventful up to time of transfer to the Naval Hospital, Boston, on the sixth day. The temperature reached its highest point on the fourth day, 101.4°. The pulse on the morning after the operation was 104 and did not go above 106 at any time. The wound was dressed daily. On the third day an incision in the right axillary region below the wound was made, giving exit to a considerable quantity of thin bloody fluid. Over the right chest about 4 inches from the sternum there was an area of superficial gangrene of the skin an inch or more in width and some 8 inches in length. The wound was mildly infected, the discharge showing

the green color of a pyocyaneus infection. There were several tender points along the course of one or more ribs, but fracture could not be positively determined.

The donor did not completely recover from the effects of the loss of blood for about three weeks. Two weeks after the operation he was complaining of weakness and cramps in the legs.

Brewer's method of direct transfusion, as used and described in the case here recorded, seems to be a decided improvement upon that of Crile. No special apparatus or such as can not be easily improvised is needed and the technique is decidedly simpler. It would appear that the Brewer method lessens the danger of air embolism and does not increase the danger of embolism from clot. Even with the Hepburn modification of the Crile cannula, transfusion by means of Brewer's tube is the simpler of the two.

The following points may be emphasized in doing direct transfusion of blood with the aid of Brewer's glass cannula:

1. Make a clean dissection and have perfect hemostasis.
2. Take care not to bruise the intima of the artery with the temporary clamp or forceps or during the necessary manipulation. A hemostat with its blades protected with pieces of small rubber tubing makes an excellent instrument for temporarily closing the vessel.
3. Draw the adventitia over the end of the vessel and cut it off, thus leaving the lumen of the vessel unobstructed.
4. Dilate the lumen of the contracted vessel by inserting the blades of a fine pair of forceps and separating them. The blades of the forceps should be covered with sterile vaseline. The application of hot saline solution to the wound also promotes dilatation of the vessel by the relaxation of its muscular fibers.
5. See that the glass tube is not obstructed by the paraffin which coats it. If the cannula, when taken from the melted paraffin, is held vertically and shaken, obstruction is not apt to occur.
6. Allow the blood to flow from the cannula before inserting it into the vein. Blood will flow very slowly at first, owing to arterial contraction, so that very little blood is lost. This precaution will prevent air embolism and will greatly minimize the danger of embolism from clot.

The danger of hemolysis has not been touched upon. When direct transfusion is needed in a case of severe hemorrhage or shock there is no time to determine whether or not the donor's blood is hemolytic to that of the patient. During transfusion the recipient's heart must be carefully watched to guard against acute dilatation, and care must be taken that the donor is not too greatly exsanguinated.

A CASE OF LIVER ABSCESS DEMONSTRATING THE VALUE OF A DIFFERENTIAL COUNT IN DIAGNOSIS.

By Surgs. E. R. STITT and H. C. CURL, U. S. Navy.

S, civilian, was admitted to hospital September 30, 1909, with nervous dyspepsia, age 37 years. He lived continuously in the Philippines since 1899, had cholera in 1902. First attack of dysentery occurred in May, 1909, which lasted for three weeks. A second attack occurred in July which lasted only one week. Stool examinations were not made. About the second week in August he began to have vague pains in region of epigastrium and to lose weight and feel "fagged out."

There had been no pain in region of liver until the morning of September 29, when he experienced a sharp pain in the region of the gall bladder and extending upward and to the right.

On admission patient was found to have some tenderness over liver and a sharp pain at a spot in the mid-axillary line between eighth and ninth ribs on taking a deep breath. Liver enlarged upward about $1\frac{1}{2}$ inches. Some crepitation heard over base of right lung. He can not lie comfortably on his left side. Temperature, 100° ; pulse, 90; leucocytes, 16,000, of which number 76 per cent were polymorphonuclear and 16 per cent large mononuclear. Stool examination was negative except for a few monads.

A definite diagnosis of liver abscess was made. On the fifth day after admission, October 4, the patient's temperature had fallen to normal and he stated that he had no pain in the region of his liver. The fact that a leucocytosis persisted with the differential characteristics given by Rogers for liver abscess supported us in our original diagnosis and he was advised operation. On October 7 he again began to have pain in liver and consented to operation, which was performed October 9, ten days after admission.

Incision between eighth and ninth ribs, $3\frac{1}{2}$ inches in length; 3 inches of each rib resected, parietal layers of pleura united, and diaphragm incised.

At a point corresponding exactly with the superficial tenderness, the largest abscess was found. This and two other smaller ones were opened, cleaned out, and drains left in them.

Recovery was absolutely uneventful and patient was allowed to walk in ten days.

This case shows the value of the differential count, as forcibly stated by Rogers, that a leucocytosis of 16,000 to 20,000, and a polymorphonuclear count of approximately 75 per cent with a percentage of 15 to 20 for large mononuclears and transitionals is very characteristic of liver abscess.

Again the point where he complained of sharp pain on deep inspiration was the point of location of the largest of the three abscesses. The result in this case shows the value of early operation.

FIVE CASES OF CHOLERA AT THE NAVAL STATION, CAVITE, P. I.

By Asst. Surg. H. L. KELLEY, U. S. Navy.

On January 11, 1910, for the first time in several years, cholera appeared in the naval forces at this station, and a report of the cases may be interesting.

The first case was that of a native Filipino seaman, whose history is very meager on account of the rapid progress of the disease. He was admitted at the dispensary, naval station, Cavite, early January 11, 1910, and gave history of much purging and pain on the evening and night before, but had no stools after admission. During the day the patient received three liters of salt solution, intravenously, but became comatose and died in the afternoon. The autopsy at Canacao Naval Hospital showed very little shrinking of the tissues, and the organs presented very few abnormalities. The fingers and toes showed active post-mortem contractions, and the intestines contained a "rice-water material," smears of which showed no motile spirilla, but cultures taken grew comma-shaped organisms in pure culture which agglutinated in 1-2000 cholera serum, establishing a definite diagnosis.

On February 4, 1910, an outbreak of the disease occurred among the marines at the Cavite Naval Station, and the patients were quickly transferred to the Naval Hospital, Canacao, P. I., where an isolation camp was established with 4 patients in whose stools cholera spirilla were found, and 3 others who gave a history of cramps and diarrhea. One patient arrived at the hospital on a stretcher in a state of extreme collapse, temperature 95°, pulse 130 and weak, eyes and cheeks sunken, hands and feet cyanotic, and fingers and toes presenting the shriveled appearance characteristic of the disease. Prognosis in this case was grave, but patient was put to bed in a warm room, with many hot-water bottles constantly applied for the following forty-eight hours. Saline solution was given frequently by hypodermoclysis under the breasts and intravenously, in all about 6,000 c. c. of solution. Cracked ice, very small amounts of water, and black coffee were given about as often as patient desired; strychnia and morphia were given as indicated. Patient recovered with no serious complications. There was anuria for the first two days. Normal weight was attained in less than two weeks. The cholera vibrio could not be found after the third day of the disease.

The three others were mild cases and developed no severe symptoms. The diarrhea disappeared, and the vibrios could not be found after the second day. The three "suspects" developed nothing interesting.

The origin of the infection could not be ascertained. All the marines gave history of eating and drinking nothing outside of the company mess. It was found that one had eaten a couple of native oranges, purchased in the native town two days before, but there had been no recent cases of cholera in Cavite or San Roque. It is believed that the disease originated in one of the towns across the bay, where there were several cases at this time, which are much frequented by enlisted men when on liberty. No other cases developed among the naval or marine forces, and no other cases have been reported in this vicinity since February 4, 1910.

THE HAGNER OPERATION: REPORT OF FIVE CASES.

By Asst. Surg. L. W. JOHNSON, U. S. Navy.

In December, 1906, Hagner, of Washington, published in the "Medical Record" a report of 6 cases of acute gonorrheal epididymitis treated by the operative method, and in December, 1909, in this same journal, he reported 12 more cases. These articles I have consulted freely, reprints being kindly furnished by their author. The operative treatment has been tried on board this ship in 5 cases with results so gratifying that it seems worth while to report them with the following tabular details:

Case.	Duration of gonorrhea.	Duration of epididymitis.	Fluid in tunica.	Pus.	Induration of epididymis.	Up and about.	Remarks.
1) C. W.	6 months.	14 days.	No.	No.	General.	Fifth day.	Scrotum as large as fist. No pain or fever after operation.
(2) W. F.	10 days.	2 days.	90 c. c.	Yes.	do.	Sixth day.	Scrotum greatly swollen. No pain or fever after operation.
(3) A. D.	2 months.	do.	No fluid, fibrinous, false membrane.	Yes.	Mostly of globus major.	do.	Discharge continued for 3 days before wound closed.
(4) J. S.	do.	6 days.	60 c. c. much fibrin.	No.	General.	Third day.	Healed very rapidly, drain removed second day.
(5) W. M.	6 months.	2 days.	90 c. c. some fibrin.	No.	Only of globus major.	do.	Extreme swelling of scrotum. No pain or fever after operation.

The report of the Surgeon-General for 1909 shows that there were in 1907 502 cases of epididymitis, causing 7,796 sick days, an average of 15.5 days for each case; in 1908 there were 501 cases, causing

8,082 sick days, an average of 16.1 days for each case. It is reasonable to state that the average number of sick days can be reduced at least one-half if the operative treatment is employed.

The relief afforded the patient by the operation is most striking. Before the operation, in all the cases here reported, there was great pain, the scrotum was distended, red, and exquisitely tender; in 4 of the cases there was fever of 101° to 103° . Following the operation there was entire absence of pain in every case, the temperature returned to normal within twenty-four hours, and the recovery was rapid.

Hagner's method has been followed in all cases. He describes it as follows:

The patient is prepared as for a major operation, and then anesthetized. Cocaine is not practicable because of the pain occasioned in handling the parts after the initial steps. At the juncture of the swollen epididymis and testicle an incision 6 to 10 cm. in length, depending on the amount of enlargement, is made through the scrotum down to the tunica vaginalis, which is opened at the juncture of the epididymis and testicle. After the serous membrane is opened all the fluid is evacuated and the enlarged epididymis examined through the wound, the testicle with its adnexa is delivered from the tunica vaginalis and enveloped in warm towels. The epididymis is then examined and multiple punctures made through its fibrous covering with a tenotome, especially over those portions where the enlargement and thickening is greatest. The knife is carried deep enough to penetrate the thickened fibrous capsule and enter the infiltrated connective tissue. When the knife is through the thickened covering of the epididymis a very marked lessening of resistance will be felt. If pus be seen to escape from any of the punctures the opening is enlarged and a small probe inserted in the direction from which the pus flows. By this method I believe there is less danger of injuring the tubes of the epididymis than by cutting with a knife. After the probe is passed in, pus will be evacuated by light massage in the region of the abscess, and a fine-pointed syringe is used to wash out the cavity with 1 to 1,000 bichloride of mercury, followed by normal salt solution. The testicle is then restored to its normal position, and in every case the tunica vaginalis is thoroughly washed out with 1 to 1,000 bichloride, followed by normal salt solution. The incision of the tunica vaginalis is lightly closed with a running catgut suture; a cigarette drain of gauze is then applied over the incision, the skin being brought together with a subcutaneous silver wire suture, the cigarette drain passing out at the lower angle of the wound. Silver foil and a sterile dressing are now applied and the part supported by a wide T-bandage.

Fluid was present in the tunica vaginalis in 3 of the cases here reported and coagulated fibrin in 3; in cases 3 and 4 this formed a membrane nearly complete over the testicle, and, when pulled off, left a raw and bleeding surface. Pus was found in only 2 of the cases and here it was in small circumscribed abscesses in the epididymis, each containing a drop or two of pus. Induration of the epididymis was general except in 2 cases which were operated on very early, and in these the induration was just beginning at the globus

major. After the operation the induration disappeared very rapidly and the nodular masses could no longer be felt on palpation.

In no case could any inflammation of the testicle be discovered; the disease was in all the cases limited to the epididymis.

The operation is simple and takes only about fifteen minutes; it reduces the time on the sick list by at least a half and saves the patient from days of suffering. I have never seen patients more grateful than those relieved from their pain by this operation.

CLINICAL NOTES FROM UNITED STATES NAVAL HOSPITAL, NORFOLK, VA.

By Passed Asst. Surg. E. O. J. EYTINGE, U. S. Navy.

Compound comminuted fracture involving the ankle joint.—On January 15, 1910, the patient fell from a staging in the bunkers of the U. S. S. *Louisiana*, and sustained a compound comminuted fracture of both bones of the right leg. Four hours after injury operation was performed. The fibula was fractured transversely, the tibia obliquely, 3 inches above the ankle joint. The anterior surface of the leg presented a jagged wound through which the upper fragment of the tibia projected at the time of injury. The lower fragment of the tibia was also fractured longitudinally, the line of fracture extending into the ankle joint. The wound contained considerable coal dust. The fragments of the tibia were drilled in three places, and the entire bone was surrounded with No. 4 chromic gut, much in the same manner that a hernial sac is tied off. Through and through drainage was established and the limb put in a fenestrated plaster cast. Fixation of the tibia acted as a splint for the fibula and brought it into satisfactory position. On April 7 the patient was recommended for sick leave. At this time wound had healed, motion in the ankle joint was free, and the patient was walking with the aid of a cane and with only a slight limp.

Double infection with Anchylostoma duodenale and Necator americanus.—V. C. D., seaman, a native of Brazil, was admitted from the Brazilian ship *Minas Geraes*, on March 4, 1910, with a diagnosis of *Anchylostomiasis*.

Patient is weak and emaciated. He is 19 years old, but appears to be undeveloped for his age. His chief complaint is abdominal pain, especially about the umbilicus. Persistent subnormal temperature and constipation are present. Urine examination is negative. Blood shows red cells, 3,000,000; white cells, 5,000; hemoglobin, 50 per cent. A differential count showed no abnormal percentage of any type of cell.

Eosinophilia was conspicuous by its absence. The stools were loaded with hookworm eggs, varying considerably in size. Ova of

Schistosomum mansoni and *Trichocephalus trichiurus* were also present. Thymol was administered on March 10. The result was the passage of an immense number of hookworms of both the old and new world types. The variation in the size of the eggs was thus explained. These findings have been confirmed by both Stiles and Garrison. Both the old and new world hookworms have been reported from Brazil, where the infection in this case undoubtedly took place; but the rare occurrence of the simultaneous presence of both species in the same patient was deemed sufficient reason for recording the case. The patient was returned to his ship on March 17, at the request of his commanding officer.

Hagner's operation for gonorrheal epididymitis and combined gonorrheal and syphilitic disease of the testicle.—No. 1: Gonorrhea of six weeks duration, from second to fourth week gonorrheal rheumatism. Two weeks ago double epididymitis. On admission November 12, 1909, both epididymi were larger, nodular, and hard, but not tender. On November 15 Hagner's operation was performed on both sides. The conditions on both sides were the same. No pus was found. The whole epididymis was involved, but the thickening was greatest in the globus minor. The tunica vaginalis contained fluid and was coated with a fibrinous exudate. Patient was discharged to duty on December 13. The urine was negative for gonococci, and no discharge had been present for one week. The epididymi were slightly larger than normal and were still hard and nodular to a moderate degree.

No. 2: Admitted to hospital October 29, 1909, with gonorrhea and subsiding right epididymitis. No operation was performed on the right side. On November 6, the left epididymis became inflamed. On November 7 Hagner's operation was performed on the left side. No fluid in the tunica vaginalis, the globus minor was $1\frac{1}{2}$ inches thick, the globus major was less involved. No pus was found. Patient improved up to November 26, when there was a slight recurrence of inflammation on the left side. Returned to duty on December 15: no discharge had been present for one week, the urine was negative for gonococci. The right epididymis was a little larger than normal and firm to the touch; the left was hard, nodular, and distinctly enlarged.

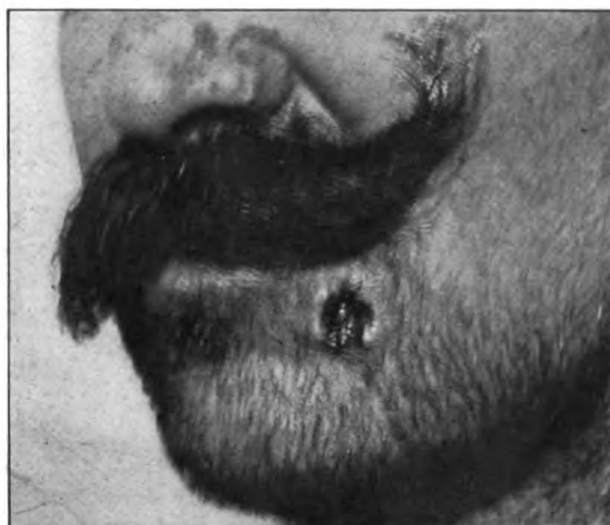
No. 3: Admitted to hospital December 14, 1909, with epididymitis. Gonorrhea of four weeks standing was present. Four days ago fell and injured left testicle. On admission the left testicle was 6 inches in diameter and extremely painful. On December 16, Hagner's operation was begun. No free space in the tunica vaginalis could be demonstrated; and the testicle was exposed with difficulty. Bleeding was profuse. The epididymis presented the usual picture of gonorrheal inflammation, but the body of the testicle was the size of an

egg, lobulated like a cauliflower and resembled brain tissue. A diagnosis of malignant disease was made, the wound was closed. The following day, the patient's consent having been obtained, the left testicle and the cord up to the external ring together with the skin surrounding the original incision were removed. Sections were first reported as "acute necrotic orchitis." Examination of the specimen removed showed that both layers of the tunica vaginalis and the tunica albuginea were adherent and that the testicle had been shelled out from the tunica albuginea. This accounts for the difficulty in so doing and for the hemorrhage and to some extent for the cauliflower appearance; but when the same procedure was carried out on the cadaver the appearances were entirely dissimilar. The patient was carefully examined. He gave a history of syphilis and showed slight general glandular enlargement. He improved under specific treatment and was discharged cured on January 17, 1910. He has since been readmitted and discharged for gonorrheal epididymitis of the right side for which no operation was performed. Hagner states that Wilkinson, of Washington, D. C., has made sections of the diseased testicle and pronounced them to be syphilitic. Evidently the condition was a combined gonorrheal epididymitis and syphilitic orchitis.

The above cases are too few in number to allow any definite statement to be made as to the value of Hagner's operation. However, the relief of pain which was constant and absolute, seems to be the only good feature of the operation in this series of cases. Case No. 1 relapsed less than ten days after leaving the hospital. Case No. 2 allowed a comparison to be made between the medical treatment on the right side and the surgical treatment on the left side, with the results in favor of the medical treatment. Case No. 3 shows that when the inflammation in the tunica vaginalis is plastic rather than serous there is danger of enucleating the testicle from the tunica albuginea by mistaking the latter for the tunica vaginalis.

Two cases of extra-genital chancre.—L. McW., water tender, admitted on January 17, 1910. A typical chancre below and to the left of the lower lip was present. According to the hospital ticket, origin was in line of duty, due to infection at the hands of a civilian barber; considerable doubt exists as to this point. Besides the chancre, general glandular enlargement and a papular syphilide were also present. Under seven injections of salicylate of mercury, a grain at each injection, the lesions entirely cleared up and patient was discharged to duty in forty-nine days.

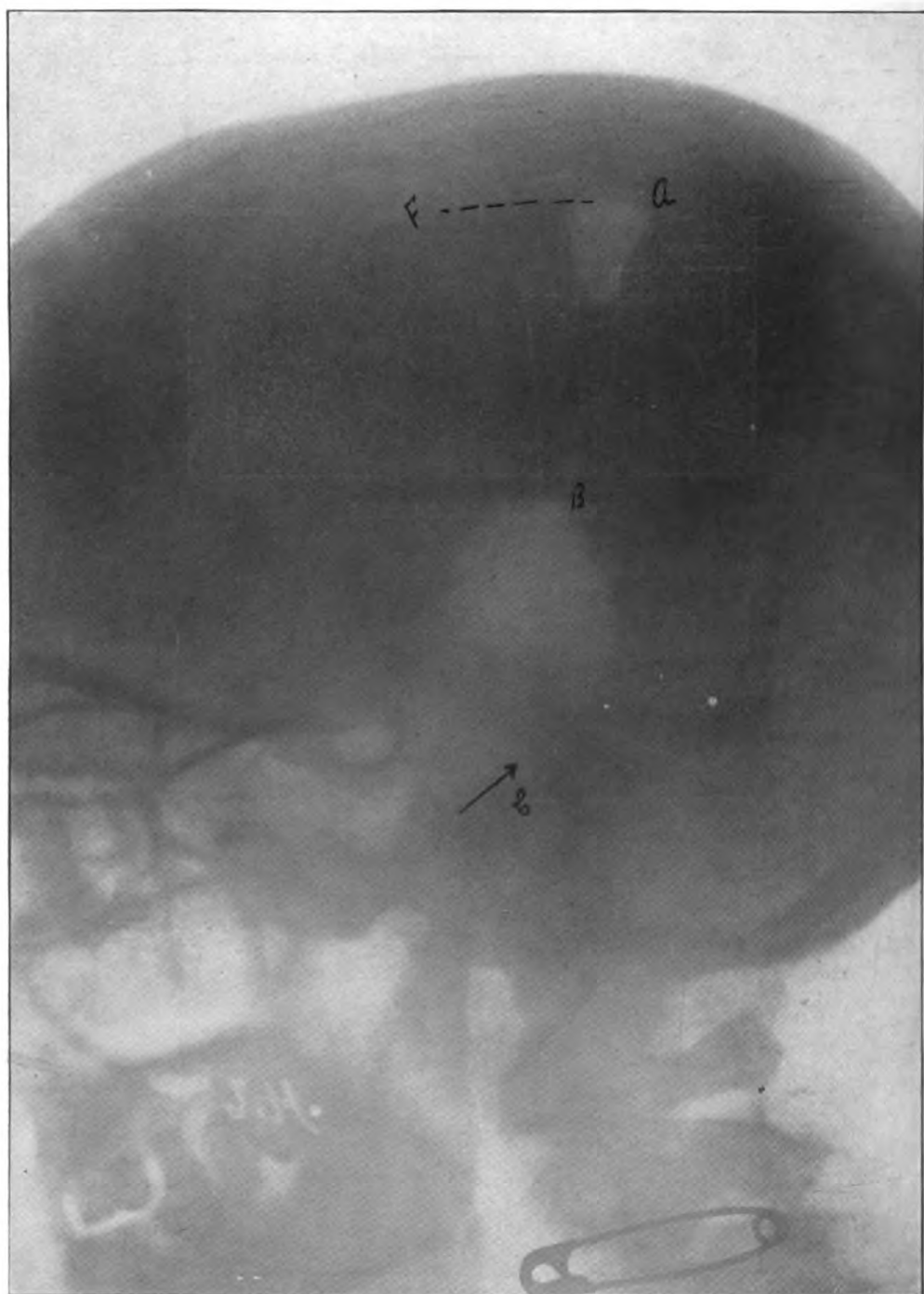
L. S., ordinary seaman, admitted on February 14, 1910. A typical chancre on the right side of the lower lip, general glandular enlargement, and a macular syphilide were present. According to the hospital ticket, origin was not in line of duty. The patient states that



EXTRA-GENITAL CHANCRE.



FRACTURE OF OS CALCIS.



FRACTURE OF THE BASE OF THE SKULL.

he had not been ashore in three months. Under five injections of salicylate of mercury the lesions cleared up and patient was ready for duty in forty-one days, but was retained in the hospital for tonsillectomy.

That the origin of both cases is in doubt is significant as regards the naval service and brings added emphasis to the need of the medical officers' personal supervision of both the ship's barber and the scuttle butt. A photograph of the first case is appended.

FRACTURE OF EPIPHYSIS OF OS CALCIS BY MUSCULAR CONTRACTION.

By Surg. RAYMOND SPEAR, U. S. Navy.

J. W. O., age 15 years, while running, noticed a sudden pain in left heel. The heel continued to hurt whenever he ran or contracted his calf muscles. The pain, however, was never severe enough to prevent walking. The X-ray picture was taken two months after injury and shows a fracture involving the epiphysis of the os calcis just below the attachment of the tendo-Achillis. "The tendo-Achillis is finally inserted into the intermediate surface on the posterior surface of the os calcis."—Cunningham.

The fracture was clearly produced by muscular contraction of the calf muscle through the tendo-Achillis and is interesting on account of its rarity.

A CASE OF FRACTURE OF THE BASE OF THE SKULL.

By Surg. RAYMOND SPEAR, U. S. Navy.

J. D. W., a carpenter while working on a new building at the Naval Medical School Hospital, fell from the attic to the basement, off a ladder. Half way down he struck a plank.

He was picked up unconscious and carried to the operating room. There was a large contused and lacerated wound of the scalp over the left eye and a compound comminuted fracture of the nose. The left clavicle was fractured and there was a Colle's fracture of the left wrist. There were also numerous contusions on both legs. The spinous process of the sixth cervical vertebra was fractured but there were no cord symptoms.

The man was in a state of coma; but he moved both arms and legs. The right eye looked inward, both pupils were contracted and fixed. The seventh nerve on the left side was involved and there was a steady trickle of blood from the left ear. It was plainly a case of fracture of the base of the skull, with probable brain involvement, so the head was shaved and disinfected.

The skull above the left eye was first examined, no fracture was found. It seemed probable that the skull ~~was~~ fractured posterior to the motor area as this area was undisturbed. There was some boggi-ness of the scalp at this site, but the scalp showed no wound. A longitudinal incision was made on the left side below the center line, backward from a point over the fissure of Rolando. A fracture of the vault involving the base of the skull now was clearly demonstrated. The fracture was of the variety described by Cushing, as "Bursting," and ran from F to A, then to B and C, probably to the foramen magnum.

The operation consisted in turning down a flap of scalp with the base downward. The skull was rongeured away at A, and a clot removed from the dura. The temporal muscle was split in the line of fracture and the skull opened at B. There was a large clot on the dura and there was active bleeding from a ruptured middle meningeal, low down in the wound. The severed vessel was ligated by passing a curved needle threaded with catgut under the vessel and tying. After removal of the clot the dura pulsed normally and was therefore not opened. Two rubber tissue drains were placed down to the dura and the wound sewed up. No anæsthetic was necessary. At the end of the operation the man had partially regained consciousness. Recovery was uneventful. The seventh nerve has regenerated partly and there is some voluntary motion in the muscles on the left side of the face. The eighth nerve on the left was also involved. Hearing in the left ear has been permanently damaged and the patient has buzzing noises in the ear. At no time has the patient's mentality been affected, nor has he suffered from headaches.

The X-ray plate, which was taken one month after injury, shows the line of fracture and the amount of bone removed. In the plate the fracture can be plainly seen connecting the two bone openings and running downward at C to the foramen magnum.

A CASE OF HEAVY HYMENOLEPIS NANA INFECTION WITH A NOTE AS TO TREATMENT.

By Surg. E. R. STITT and Asst. Surg. D. G. ALLEN, U. S. Navy.

S., ordinary seaman, was admitted December 2, 1909, for operation for hernia. Upon routine examination of his feces he was found to have a hymenolepis infection. Treatment with male fern was ordered, but through a misunderstanding the ordinary thymol treatment, as given for hookworm infection, was administered.

In the first stool passed after the completion of the treatment, approximately 1,500 of these dwarf tapeworms were counted. The

method was to count the number in one-tenth of the quantity of the stool and multiply by 10.

Since that time it has been impossible to find hymenolepis eggs in his stools. This case is of interest as showing the efficacy of thymol in this infection, notwithstanding the statement usually made in works on helminthological therapeutics that thymol is not efficacious in this infection.

REPORT OF TWELVE CASES OF BERIBERI.

By Passed Asst. Surg. J. A. RANDALL, U. S. Navy.

On October 16, 1909, two lascars were admitted to the United States Naval Hospital, Canacao, P. I., from the British S. S. *Knight Templar*, which was lying alongside the Sangley Point coaling plant, having brought out a cargo of coal from the United States. These two cases were diagnosed as beriberi, and the clinical reports follow:

On the morning of October 25, I was sent out to the *Knight Templar* to investigate a death which had occurred during the night. I found the body of a lascar fireman who had been sick about a week, with swelling of legs and feet and a feeling of tightness in the chest. The master stated that several others of the crew were similarly affected, and upon examining them I found 10 suffering from beriberi. These cases were transferred to the hospital.

The crew were all lascars shipped at Bombay at the beginning of this voyage. One case of beriberi occurred on the trip from India to England. No more cases occurred until after leaving Newport News for Cavite via Suez. The death here was the first to occur on board.

The quarters of the crew were situated aft, and were commodious, clean, and well ventilated.

Case 1.—Sheik Mohideon Nacoo, aet., 40 years, native of Bombay. About four weeks ago began to complain of pain and tightness in chest. Soon began to have difficulty in walking. Had no feeling in hands and legs, and finally became unable to walk.

On admission to this hospital patient was unable to walk or stand alone; marked weakness of leg and arm muscles; incoordination of hands and feet; patellar reflex absent; no Babinski reflex or ankle clonus. Pupils react to light and accommodation. Some anesthesia over shins and dorsum of hands and fingers. Slight systolic murmur over apex.

Under treatment and liberal diet he improved somewhat until he could walk with aid of stick.

On discharge, gait was still quite ataxic. Deep reflexes absent. All anesthesia had disappeared.

Case 2.—Mohamed Fukeer, aet. 17 years, native of Bombay. Illness began about one week ago with pain in epigastrium and edema of feet and legs. On admission patient appears very sick and can not stand on account of weakness

of legs. There is present ataxia of hands and feet. Anæsthesia over feet, legs, wrists, dorsum of hands and fingers. Slight pressure in epigastrium causes pain. Pressure over shins and calf muscles causes considerable pain. Heart sounds evenly spaced. Urine shows slight trace of albumin and large number of finely granular casts. Passes very small amount of urine. Vomits all food. The vomiting continued and respiration became very rapid and labored. Respiration was accomplished entirely by accessory muscles, there being paresis of diaphragm. The heart was enlarged to the right, and the circulation became more and more embarrassed until death occurred on the eighth day. An autopsy was refused on account of religious scruples.

Case 3.—Mohamed Gulam Hasan, aet. 20 years, native of Bombay. Onset of illness about ten days ago, with pain in epigastrium and swelling of feet and legs. On admission, temperature 100°, respiration 24, pulse 96. Much prostration. Complains of pain in epigastrium, and can not bear the slightest pressure in that region. Heart sounds evenly spaced. Has considerable cough, and there are moist râles over both lungs. There is edema of ankles and shins. Patellar reflex is present. No ankle clonus or Babinski reflex. Cremasteric reflex active. Anæsthesia is total over feet, legs, thighs, arms, forearms, and hands. The distressing symptoms continued for several days when he began to make some improvement, which continued until the date of his discharge, on the eleventh day after admission. At this time the heart action was much improved and the dyspnoea had disappeared. Anæsthesia only over feet and legs.

Case 4.—Abraham Abdabaran, aet. 19 years, native of Bombay. Onset one month ago, with pain in extremities and edema of shins. On admission there is present edema over shins and anæsthesia over feet, legs, inner side thighs, wrists, and dorsum of hands. Pressure over muscles of legs and forearms very painful. Gait markedly spastic. Some ataxia of hands. Romberg's sign marked. Patella reflex absent. Cremasteric reflex active. Second sound of heart accentuated. This patient improved until discharge, at which time the gait was still spastic. Heart sounds were normal. Anæsthesia limited to fingers and shins.

Of the remaining 8 cases none presented symptoms of particular interest. All presented swelling of the ankles and shins in varying degrees. Several had heart murmurs which disappeared before discharge. These patients were all put upon a liberal meat diet, with the exclusion of rice and other bulky foods. They were also given strychnine and Tinc. Ferri Chloridi.

CARRON OIL IN THE TREATMENT OF OTITIS MEDIA SUPPURATIVA (ACUTA).

By Passed Asst. Surg. R. E. RIGGS, U. S. Navy.

In the October number of the Naval Medical Bulletin, I reported two cases of this disease cured by the injection of carron oil into the middle ear, and ventured to predict a promising future for this procedure in similar cases.

Until recently no opportunity has offered for further investigation of the treatment, and even now I hesitate, since I have only one additional case to report. Seeing, however, that this represents 100 per cent of cures in my patients, I am still enthusiastic as to the

efficacy of carron oil in the treatment of acute suppurative *otitis media*.

On January 25, J. P., private, U. S. Marine Corps, was admitted to hospital with *otitis media*, and was anesthetized the same night for proper puncture of the drum membrane. This operation proved to be difficult on account of a coexisting *otitis externa*. The same difficulty prevented my seeing the drum for several days; and it was not until February 1 that I succeeded in injecting the oil. Modified carron oil (lime water and olive oil) was then employed, and this was repeated for three days with only slight improvement. On the 4th, carron oil proper (lime water and linseed oil) was injected, and the treatment repeated the next day. By the 6th, or two days after the first proper treatment, suppuration had ceased altogether, and the opening in the drum promptly closed.

Two conclusions seem to be justified: First, that the treatment is unequaled by any other procedure known to me; and second, that carron oil made up with linseed oil is much superior to the substitute which contains olive oil.

PERICARDITIS ASSOCIATED WITH IMPETIGO HERPETIFORMIS (?), FOLLOWED BY GRAVE SYSTEMIC DISTURBANCE AND INTERESTING PATHOLOGICAL LESIONS.

By Asst. Surg. H. L. KELLEY, U. S. Navy.

The following case is considered of interest because of the difficulty in locating the origin of the infecting organism, and the rather remarkable number of pathological lesions found.

O., a corporal, U. S. Marine Corps, age 43 years, was admitted at the yard dispensary, Cavite, P. I., with symptoms resembling dengue; temperature 104°, pains all over body, and weakness. For four days he had daily chills, and on the ninth day of the disease he was admitted to the United States Naval Hospital, Canacao, P. I.

Upon admission to the hospital the patient had temperature of 102.5°, enlarged spleen, slight diarrhea, palpable liver, and presented in both axillæ active lesions of an impetigo, which later spread over entire back, to chest and abdomen. The lungs appeared normal. Cardiac dullness increased above and to the left.

Three "widals" were negative. Blood examination negative for parasites; leucocyte count ranged from 6,700 to 9,000; polys, 68 to 75 per cent, differential negative. Sputum negative for tubercle bacilli. Feces normal. Urine contained pus. Smear from impetigo lesions showed staphylococcus aureus, which also appeared in blood culture on thirteenth day.

During illness temperature gradually rose to 106° on fifteenth day, pulse to 152, and respiration to 64. Cardiac dullness always en-

larged, but no friction rubs or murmurs made out. Patient died on fifteenth day of disease.

Autopsy revealed purulent pericarditis, pericardial sac filled with turbid fluid, "cor villosum," suppurative myocarditis, with numerous abscesses in heart muscle. Heart valves appeared normal. Both parietal and visceral pericardium were covered with fibrinous exudate. Left lung adherent to diaphragm, left pleural cavity contained 400 c. c. of turbid fluid. Lung tissue of both lungs appeared normal. Liver showed chronic atrophic cirrhosis, and several abscesses under capsule and in the liver tissue. Spleen weighed 750 grams, showed chronic passive congestion and numerous abscesses throughout. Both kidneys enlarged, showed interstitial nephritis, and tissue filled with miliary abscesses. Other organs appeared normal. Culture from abscesses in various organs showed *S. aureus*. From the foregoing the difficulty of diagnosis and determination of etiology is apparent.

The onset of disease during an epidemic of dengue, with no history of rheumatism or previous illness, with continual high average temperature, the absence of leucocytosis, and the presence of staphylococci in the blood, and presence of a diffuse impetigo, are confusing.

During the patient's illness there were no symptoms or signs, except for the chills, slight enlargement of cardiac dullness, and rapid pulse referable to the pericardium.

Regarding the etiology in a case presenting these difficulties, and in the apparent absence of other primary focus, may not the impetigo be considered as the primary focus?

BLASTOMYCOTIC LESIONS IN A CASE OF SYPHILIS.

By Surg. E. R. STITT and Asst. Surg. S. L. HIGGINS, U. S. Navy.

M., a private, U. S. Marine Corps, was admitted June 7, with secondary syphilis, the primary sore having appeared three weeks previously. The macular rash, which later became papular, was very profuse over the entire body, and particularly so on forehead and face.

By August 1 the rash had almost cleared up. On August 15 the papules began to reappear and by the 20th there was a profuse, bluish tinged, tuberculated eruption, with some umbilicated papules especially symmetrically disposed on forehead, cheeks, and neck.

Scrapings from these lesions showed the greatest profusion of yeasts, mostly budding forms, but no mycelial growth. Two days later scrapings were again made, but the yeast cells were less numer-

ous. Cultures on maltose agar were made at this time but failed to show any growth, bacterial, or mold.

The material used for inoculating the maltose agar was obtained from the pulp-like base of the lesions after the superficial portion had been scraped away with aseptic precautions.

On August 25 two of the umbilicated papules were excised and sectioned, but no yeast forms could be observed in the sections stained by either Giemsa's stain or by Gram's method. From this time the lesions quickly began to disappear, so that on September 5 the eruption was recorded as having entirely faded away. The lesion did not show the border of minute abscesses so characteristic of *blastomycetic dermatitis*.

CURRENT COMMENT.

[It is to be remembered that in the publication of these comments the bureau does not necessarily undertake to indorse the opinions expressed, but will lend the pages of this section to discussion of such contemporary topics as will be of interest and value to the service.]

RESULTS OF VENEREAL PROPHYLAXIS NOT LIKELY TO BE APPARENT IN GENERAL STATISTICS OF 1909.

In his interesting report on Venereal Prophylaxis on the Asiatic Station, which covers the year 1909, Medical Inspector Diehl truly remarks (vide p. 334) that "it is impossible to state to what extent prophylactic treatment has actually reduced venereal disease." The statistical returns from stations on shore and such ships as were attached to the Asiatic Station during both 1908 and 1909 would indicate an increase for the latter year of nearly 60 per cent in primary admissions, but how many of the excess would be accounted for by certain increases in complement, more transfers, and more liberties would be difficult to estimate. No record of the number of liberties is available for 1908. It is probable that by far the greater part of the increase is due to the admission of practically, if not actually, every case of venereal disease during 1909, when inspections of the crew were carried out, and throughout each year it is fair to assume that the attention of medical officers was more continuously concentrated upon this class of disease.

These latter factors will doubtless account for an increased admission rate throughout the service, and a definite measure of the influence of prophylaxis must be deferred until the statistics for 1910 are available one year hence.

TYPHOID VACCINATION.

The bureau desires to correct the erroneous impression referred to in a recent communication from the United States Naval Medical School, which states in part:

An order for bacterial vaccines to be used for immunizing purposes, on this laboratory, could only have been made under an impression that this laboratory was equipped with a special department exclusively devoted to this branch of bacteriological work, which it is not. Since, therefore, we could not fill that

part of the order referring to the vaccines it was thought that a few words in explanation of our position relative to the manufacture of vaccines would be due the bureau.

The chief consideration in the manufacture of vaccines for immunizing purposes must always be the absolute freedom from contamination, especially spore-bearing tetanus bacilli. Such freedom from contamination to be absolute can only be guaranteed in a laboratory especially equipped and devoted to the manufacture of vaccines and in which practically no other bacteriological work is done. Attempts at compromise have always resulted in disastrous results. In this connection it is only necessary to cite the unfortunate consequences of inoculating with the tetanus contaminated plague vaccine in India a few years ago and the more recent accidents recorded in St. Louis with a tetanus contaminated diphtheria vaccine.

In a general laboratory in which all kinds of bacteria, including spore-bearing organisms, are handled by the instructors while teaching, such a guarantee as would absolutely exclude all possible contamination, could not be expected.

While the manufacture of antitoxins [and vaccines] is a matter of no great difficulty, and while the making of such vaccines in our laboratory is a matter of daily occurrence in experiments on animals, and while we might even succeed in obtaining vaccines that could be safely used in human beings, and would therefore be absolutely safe, it would be impossible to guarantee continued success in this respect and one disaster would jeopardize our very existence.

Through the courtesy of the Surgeon-General of the Army arrangements have been made whereby, upon receipt of telegraphic or written requests for typhoid vaccine for any definite number of individuals, the Bureau of Medicine and Surgery will request the Army Medical Museum laboratory to forward the same to the medical officer making the request. No formal requisition will be required, and in order to obviate any delay it will be assumed that the request is made with the approval of the commanding officer.

Pending the adoption of typhoid vaccination for the entire service and the publication of definite instructions it is requested that the fact of each immunization, with the number of doses, shall be entered on the individual's health record, and that the total number of persons thus immunized and the number of cases of typhoid developing in vaccinated persons be included in annual reports from hospitals, ships, and stations. Readmissions from hospitals should, of course, *not* be reported.

The card which accompanies the vaccine should, after the "third dose" has been recorded and the matter of reaction noted, be mailed promptly to the bureau, which, after noting, will undertake its transmission to the Medical Department of the Army for its statistical purposes.

INTERNATIONAL MILITARY MEDICAL STATISTICS.

In connection with the suggested desirability for international vital statistics for naval services the following interesting points are gleaned from "Ergebnisse der internationalen Militärsanitätsstatistik," read by Generalstabsarzt Dr. Myrdacz at Budapest, September, 1909:

This digest of sanitary statistics was compiled from data contributed by 12 countries. The periods embraced differ for the various countries and range between two years for Servia to thirteen years for Austria-Hungary, Russia, and England. The basis for all the calculations was the total strength of the armies exclusive of officers. The average strength for the years covered by the data submitted by the respective countries was as follows: Russia, 1,063,863; Prussia, 527,399; France, 503,166; Austria, 290,790; England, 218,692; Italy, 204,771; Spain, 80,597; Bavaria, 63,845; United States, 53,498; Belgium, 39,559; Netherlands, 26,456; Servia, 25,375.

The average annual total admissions, per thousand of strength, in round numbers, were for Russia, 346; France, 625; Prussia, 638; Austria, 706; Italy, 731; Bavaria, 873; Spain, 958; Servia, 1,197; Netherlands, 1,355; United States, 1,491. The wide variation in these figures is said to be attributable to differences which exist in the various services in the rules controlling admissions to the recorded statistics, and the fact that in some instances the statistics only show actual admissions to hospital.

Mortality.—The average annual death rate per thousand of strength, exclusive of suicides and deaths by accident, were: For Prussia, 1.31; Bavaria, 1.47; Belgium, 1.80; Netherlands, 2.73; Austria, 2.82; Italy, 3.80; Spain, 4.41; Russia, 4.48; Servia, 6.75; England, 7.82; United States, 9.70; and for France, including suicide and deaths as result by accident, the rate was 4.26. The author explains the high rate given for the United States by the fact that during the years 1898-1900 the death rate was 21.74 as the result of the occupation of Cuba and the Philippine Islands. This high mortality rate tended to increase the average for the eleven years for which the United States furnished statistics in this digest.

The rate of discharges to duty per thousand of discharges was: For Belgium, 863; Austria, 870; Servia, 879; Russia, 903; Spain, 925; Bavaria, 941; Prussia, 941; United States, 947; Netherlands, 949. The mortality rate per thousand of total discharges was: Bavaria, 1.74; Netherlands, 2.02; Prussia, 2.05; Austria, 3.98; Belgium, 4.17; United States, 4.20; Spain, 4.26; Servia, 6.05; Russia, 13.20.

The average sick days per man based on the total strength was: Prussia, 9.3; Russia, 9.5; France, 9.9; Bavaria, 10.9; Servia, 11.7; Austria, 13.1; United States, 15.6; England, 18.8.

Deaths.—The statistics showed that based on the deaths per thousand, disease was responsible for death during the first year of service as follows: England, 62; United States, 146; Netherlands, 308; Russia, 344; Belgium, 349; Austria, 407; Spain, 469; Prussia, 485; Italy, 495; France, 525; Bavaria, 529; Servia, 704.

The per thousand rate of suicides during first year of service was: For England, 64; United States, 136; Netherlands, 158; Russia, 278; Italy, 297; Bavaria, 407; France, 474; Prussia, 502; Austria, 526; Spain, 579; Servia, 833. These figures, however, have no great value inasmuch as it has not been determined how many men of the total strength are serving in their first year. Were this

fact known it could be determined what proportion per thousand of men in their first year of service have lost their lives through disease, suicide, and accidents, and to what degree the first year of enlistment is responsible for these deaths as compared with succeeding years of service.

Under special diseases, the following are of interest:

Alcoholism.—In Austria and Serbia this disease is not registered. The greatest frequency for acute alcoholism occurs in the United States, with 28 per thousand of strength. England is second with 2.8, and for the remaining countries which submitted data on this disease the figures range between 0.05 for Spain and 0.15 for Italy.

Gonorrhea.—This disease has the highest frequency in England with 88, and in the United States with 83 per thousand of strength. Prussia and Bavaria show the lowest figures with 12.3 and 13.3, respectively. The remaining countries range between 19.7 for France and 47.1 for Italy.

Insolation.—Occurs most frequently in England, with 1.6 per thousand, followed by the United States with 1.25; Belgium, 0.9, and the lowest rate is for Spain with 0.01.

Syphilis.—For England the rate is 94.3 per thousand of strength; United States, 21.2; Austria, 18.9. The lowest figures for this disease are for Bavaria with 3.9 and Prussia with 4.1. The other countries vary between 5.8 and 13.7.

Tuberculosis, pulmonary.—Most frequent for Spain with 7.6, followed by France, Netherlands, and Belgium with 4.9 to 4.4. Italy has the lowest figure with 1.1. The other countries range between 1.6 and 3.5.

Typhoid fever.—Highest frequency for England with 9.6 per thousand of strength, followed by France with 6.4 and Russia with 6.2. Prussia shows the lowest figure with 1.1. In seven countries, including Prussia, Italy, Russia, Belgium, Netherlands, Spain, and the United States, the maximum admissions were shown to fall within the quarter embraced by August and October, which furnished from 37 to 60 per cent of the total admissions.

Chancroid.—This disease is not accounted for in the returns from Netherlands, England, and Serbia, and in the other countries only since 1901. The United States reports the highest frequency with 33.9, followed by Spain with 28, the lowest being Belgium with 0.6. Bavaria shows 1.6, Prussia and France 2.3 per thousand of strength.

VARICOCELE AND THE PUBLIC SERVICES.

The London Lancet of March 26, 1910, page 869, has some comments to make on "Varicocele and the public services" which are well worthy of being seriously considered by all recruiting officers. It states that—

It is the practice in most centers of enlistment for the army and navy when a man who has a varicocele, but is otherwise an unobjectionable recruit, is rejected, to tell the candidate that if he has an operation performed on the varicocele he can come up again before the authorities, when he will be admitted. * * * Nearly every surgeon attached to a general hospital operates yearly on a large number of these young men, and in the vast majority of them no operation is needed. A few surgeons refuse to operate, considering the operation unjustifiable; others operate, not wishing to refuse removing an obstacle which stands, however wrongly, between a desirable candidate and his admission into a public service.

Is it indeed reasonable "that young men, in other ways desirable as soldiers or sailors, should be refused admission in consequence of possessing a varicocele unless they submit to an operation?"

Varicocele is a common affection occurring in many young men about the period of sexual maturity. It varies greatly in extent, being confined to one or two veins in some, in others comprising all the veins of the cord as well as some of the testicle itself. But the fact remains, whether it is a normal or an abnormal condition, that in the vast majority of cases a varicocele gives rise to no symptoms whatever and that the percentage of cases of an uncomfortable sensation being experienced is exceedingly small. Many army surgeons with a large experience in active service have never met with a single case where a varicocele has given rise to serious trouble or was the cause of malingering. And, therefore, we agree with our contemporary in that—

Varicocele should not of itself be a cause of rejection of candidates for the services who are otherwise suitable, and candidates should never be advised or required to submit themselves to operation for its cure.—Medical Inspector H. G. BEYER.

IMPORTANCE OF OPHTHALMOSCOPY AT RECRUITING STATIONS.

By Surg. J. A. MURPHY, U. S. Navy.

I have the honor to submit the results of systematic ophthalmoscopic examination of the eyes of applicants applying at the United States Marine recruiting office, New York, for enlistment during the past six months, believing that the same will be of interest, in view of the fact that about 7 per cent of the men examined, with vision equaling $\frac{1}{10}$ Sn. or better, have shown old or recent defects (other than refractive), which, after enlistment, might be the cause of disability with consequent question as to origin and right to pension.

It is not usual to make a fundus examination at recruiting offices for the reason, perhaps, that certain facilities are thought to be necessary for a proper finding, and a further belief that time would be lacking when many candidates appear. It has been found at this office that a dark room with special equipment is not needed, and that with practice and increasing skill, and the use of the indirect method of applying the ophthalmoscope, that at the most two minutes has been sufficient to obtain a satisfactory view of the interior of the eye and its freedom from gross lesions.

At the same time the ear, mouth, and nose can be looked into and defects of these parts noted, if any.

A light may be improvised by use of a simple pasteboard box, such as uniform caps come in, fitted with a frosted incandescent lamp

of 16 candlepower, the whole being hung or nailed in a semidark corner of the examining room, and serving for the purpose of illuminating the parts under observation.

The shutting in of all rays, except those desired for reflection, from the mirror makes the need for the usual dark room, with unreflecting black surface, unnecessary. A metal hood could be used for a gas flame, with slight modification.

The following cases are noted in the order in which they appeared for enlistment:

No.	Vision.	Defect.
1	L. E. 15/20.....	Small posterior polar cataract.
2	L. E. 20/20.....	Opaque nerve fibers above nerve head (physiological).
3	R. E. 20/20.....	Small patch old choroiditis below and to nasal side.
4	L. E. 20/20.....	Small opacity upper nasal quadrant lens.
5	R. E. 20/20.....	Small patch old choroiditis above nerve head.
6	L. E. 20/20.....	Temporal scleral crescent.
7	B. E. 20/20.....	Pigment deposits retina.
8	B. E. 20/20.....	Temporal scleral crescent.
9	R. E. 20/20.....	Temporal scleral crescent, well marked, left eye.
	L. E. 15/20.....	
10	R. E. 20/20.....	Vision blurring with use; spasm of accommodation; pigment deposits retina; patch of old choroiditis peripherally.
11	R. E. 20/20.....	Pigment deposits retina.
	L. E. 18/20.....	Pigment deposits retina; small opacities peripheral lens.
12	L. E. 18/20.....	Old choroiditis nasal side; slight convergent squint.
13	R. E. 20/20.....	Fine granular floating opacities of vitreous (vision decreasing on moving eye); temporal scleral crescent; pigment deposits retina.
	L. E. 20/20.....	Pigment deposits retina; temporal scleral crescent.
14	L. E. 20/20.....	Pigment deposits retina.
15	L. E. 20/20.....	Pupil dilating irregularly in dark (old iritis); posterior synechia.
16	R. E. 20/20.....	Temporal scleral crescent; more marked in left eye.
	L. E. 15/20.....	
17	L. E. 18/20.....	Patch choroiditis (partly old) upper nasal side.
18	R. E. 20/20.....	Two small pin point opacities lens.
19	R. E. 20/20.....	Small opacity upper nasal quadrant lens.
20	R. E. 15/20.....	Several small patches (recent) choroiditis upper nasal side.
21	R. E. 20/20.....	Pin-point opacities lens.
22	R. E. 20/20.....	Do.
23	R. E. 20/20.....	Opaque nerve fibers (physiological).
24	L. E. 20/20.....	Pin-point opacity inner quadrant lens.
25	L. E. 20/20.....	Pigment deposits retinal vessels nasal side.

In glancing over the above list one naturally thinks of prognosis and its effect on the effectiveness of the recruit, and, in this connection, I would like to state that many of the above defects were considered as unimportant for the present at least, a notation in the enlistment record being deemed sufficient to protect the Government from future unjust claims.

The bearing that such a defect would have as to origin, in case of future trouble, would, of course, be a matter for a board of medical survey to determine.

Some of the cases (though coming up to the usual requirements) were not enlisted because it was considered that the fault was progressing or that the risk was a poor one.

Case No. 13 would, undoubtedly, have been surveyed for defective vision soon after entering the service, and the examining surgeon would have been credited with carelessness in obtaining the vision in

the usual way. This condition could not have been discovered on enlistment except by the use of the ophthalmoscope.

Case No. 15 would have been overlooked in the ordinary examination because the synechia did not show until the pupil dilated under less illumination, showing irregularity, and the reason, therefore, when the ophthalmoscope was put in service.

Those cases showing pin-point opacities mostly toward the periphery of the lens were remains, perhaps, of old posterior synechia, which had torn away, leaving a section of the posterior pigment layer of the iris on the anterior capsule of the lens as a reminder that an iritis once existed, with a possible predisposition toward that condition for the future.

In those cases in which crescents about the nerve head were noted it might be expected that subsequently axial myopia would develop, and if the stretching continued (if not in abeyance) appearance of inflammatory changes, with marked decrease in visual power.

The examination of eyes with vision below 15/20 Sn. served to confirm the opinion that many apparently benign conditions were really a preliminary warning of what might be expected later as regards visual acuity.

PROGRESS IN MEDICAL SCIENCES.

CHEMISTRY AND PHARMACY.

Asst. Surg. E. W. BROWN and Pharmacist PAUL J. WALDNER, U. S. Navy.

TOPLIS, WM. G. **Rapid chemical filtration compared to slow sand filtration.**
Amer. Jour. Pharm., May, 1910.

Several instances are cited of the employment of rapidly acting chemical filters specially adapted to treat waters having unusual sources of contamination. The simplest and best known filter in which chemical agencies are employed to bring about clarification consists of the addition of alum to the water which, with the bicarbonate of calcium usually present in all river and spring water, forms a voluminous gelatinous precipitate which embraces all suspended matter and holds it in the sand. In this filter the action is purely physical except the formation of the aluminum hydrate and no oxidation takes place. The author states that recently a method of chemical filtration has been devised in which oxidation of organic matter is brought about by the addition to the water before filtration of two or three parts per million of calcium hypochlorite. This process has the advantage over slow sand filtration in that it is much faster and can be accomplished in relatively restricted space. In a direct communication Toplis describes how oxidation is effected by this means as differing from that brought about by bacterial agency. The chlorinated lime yields chlorine which, reacting on the organic matter, takes up hydrogen and liberates oxygen. This oxygen in its nascent state brings about the oxidation changes. Taking urea as an example of organic contamination the elements C, H, O, and N are disposed of as follows:

By bacterial agency: C as CO_2 , H as H_2O , O as H_2O , N as HNO_3 .

Through the agency of chlorine: C as CO_2 , H as HCl , O as CO_2 , N dissipated as gas.

In this process the chlorides are increased, but as their source is known to be innocuous they may be disregarded. The presence of the small amount of chlorinated lime indicated above is said to instantly and very materially reduce the number of bacterial colonies.

Water contaminated by a dyeworks was cleared successfully by taking advantage of the property which aluminum hydrate has of

forming insoluble lakes with dyes. In another instance excessive quantities of iron were removed by treatment with small quantities of calcium hydroxide. Rapid chemical filtration appears to have a special field in the treatment of so-called hard waters. Hardness being usually due to the presence of bicarbonate and sulphate of calcium, the process consists of conversion of the bicarbonate of calcium into neutral carbonate by the addition of calcium hydroxide and afterward the addition of sodium carbonate to neutralize the excess of calcium hydroxide and to convert the sulphate of calcium into carbonate. The precipitates are removed in the filter while the sodium sulphate remains in solution together with a small amount of calcium carbonate. Precise manipulation is required to avoid excess of reagents.—(P. J. W.)

LANGSTEIN. The question of the so-called physiological albuminuria. *Med. Naturw. Arch.*, No. 2.

According to the author the physiological status of albuminuria can only be settled in the following manner: Twenty-four hour samples of the urine of clinically normal individuals must be examined for albumin during a long period of observation to see whether albumin can periodically be excreted. It must also be demonstrated that the proteid found in the urine originates from the blood and not from the mucous membrane of the urinary passages. Two cases are referred to in which there was proteid excretion without any anatomical lesion of the kidney. One was the case of a woman who had albuminuria only in the standing position; post-mortem there was no nephritic involvement. In regard to the cause of such albuminuria one could assume that proteid matter was excreted which could not be assimilated; in this case the proteid excreted was precipitable by acetic acid. This, however, would be no criterion as to the nature and availability of the proteid substance, nor would this account for the degree of permeability of the kidney parenchyma. Jehle has explained a large number of albuminurias by the damming up of blood in the venacava secondary to lordosis. According to the writer this would not apply to all such cases as an explanation on purely mechanical grounds, and he has found the urine albumin free in advanced conditions of lordosis.—(E. W. B.)

BANG, I., and BOHMANNSTON, G. A contribution to Bang's method for estimation of sugar. *Zeitschr. f. physiol. Chem.* Vol. 63, p. 443.

Bang's titration method in the presence of potassium sulphocyanate and alkali carbonate frequently is defective in the sharpness of the end reaction, due to pigments of the urine. Such urinary constit-

uents as uric acid, creatinine, and urochrom influence the reduction. This defect is remedied as follows: 20 c. c. of urine are stirred with 5 c. c. of 25 per cent HCl and 2 grams of blood charcoal for five minutes, passed through a dry filter, and 10 c. c. of the filtrate titrated by Bang's method. By this method the reduction in normal urine is lowered about one-half, while in diabetic urines the same results are obtained as with other clearing methods with the advantage of greater simplicity.—(E. W. B.)

BJORN-ANDERSON, H. and LAURITZEN, M. The estimation of ammonia and acidity in the urine and their clinical application. *Zeitschr. f. physiol. Chem.* Vol. 64, p. 21.

The formaline titration method for ammonia is recommended. The results are slightly higher than strictly accurate data, but sufficiently accurate for clinical purposes. Total acidity, ammonia and total nitrogen were determined in an enormous number, both of normal cases and of clinical cases of diabetes. The writers report that the total acidity of the urine rose and fell proportionally to the ammonia content; the ammonia quotient ($\frac{\text{ammonia nitrogen}}{\text{total nitrogen}}$) did not show this parallelism, and the conclusion was drawn that it is the total acidity, and not the total nitrogen, which conditions the amount of ammonia in the urine.—(E. W. B.)

WEINBERGER, W. Thymol as a source of error in Heller's test for urinary protein. *Jour. Amer. Med. Assoc.* Vol. LIV, p. 310.

In urines preserved with thymol a grayish-white ring separates on applying Heller's test. This may easily be confused with protein, as it occurs at the zone of contact. Alkaline urines give a heavier ring, as thymol is more soluble than under conditions of an acid reaction. The writer recommends that the sample of urine be shaken for two minutes with an equal volume of petroleum ether before Heller's test. This removes the thymol completely. It is important to remember that after the internal administration of thymol, as in the therapeutics of uciniriasis, the urine contains thymol-glucuronic acid, which is not removed by extraction with petroleum ether. Thus the urine of a dog gave a positive Heller's test after the ingestion of 5 grams of thymol in spite of extraction with petroleum ether.—(E. W. B.)

REPRINTS FROM CHEMICAL ABSTRACTS. (American Chemical Society, vol. 4, Nos. 6 and 10.)

Physiological effects of high temperature and humidity. G. J. YOUNG. Eng. Min. J., 88, 1155-6.—A study made by author to determine the physiological effects of high temperature and humidity has led to the following conclusions: (1) Moderately high temperature, from 95° to 105° F., with moderate humidities, from 50 to 70 per cent relative humidity, and with air currents of velocities from 200 to 300 feet per minute, do not prevent efficient work nor are they particularly uncomfortable. (2) A higher temperature, from 110° to 115°, together with the same conditions as above, decreases efficiency to a considerable extent. (3) A high temperature, from 110° to 115°, with high humidity and a moderate velocity air current, very greatly impair the miners' efficiency, and a still higher air velocity, under the same conditions, renders working more bearable, but miners do not work very long at one time. (4) A moderately high temperature, from 95° to 105°, in a saturated atmosphere with no current, becomes very trying. Prolonged exposure with much exertion is dangerous. (5) A moderate temperature, from 90° to 98°, in saturated air currents of a velocity of 400-500 feet per minute, and with more or less vitiated air, are conditions which are very trying and give a low labor efficiency. Vitiated air will impair labor efficiency to a greater extent than a high temperature.

ROBERT KANN.

Direct identification of acetone in urine. B. BARDACH. Vienna. Z. anal. Chem., 49, 103-6.—To 3 c. c. of filtered urine, 1 c. c. of a 3 per cent peptone solution was added and then Lugol's solution until a deep red-brown color was obtained. After adding 1-2 c. c. NH₄OH and 1.5 hours standing, HCl was added to acidity. 0.01 per cent acetone could readily be detected in urine. The test was not interfered with by the presence of albumin, sugar, blood, bile pigments, urinary pigments, oxalates or EtOH. Acetoacetic acid reacts to give the test.

I. K. PHELPS.

The pancreas reaction of Cammidge. H. ELLENBECK. Heidelberg. Kinderklinik. Blochem. Z., 24, 22-39.—The author has tested the Cammidge reaction (formation of a crystalline phenylhydrazine compound in urine free from sugar and albumin) on urine from 24 individuals, some of whom were normal, others suffering from various pathological conditions. Some of the cases were infants, some adults. The reaction was performed with special precautions, the solutions being centrifugated and the deposit examined for crystals with the microscope when the reaction was doubtful. The author concludes that the reaction is of no diagnostic value. It is sometimes positive, sometimes negative, in normal and slightly ill individuals. The variations in the reaction appear partly due to diet. The substance which forms the crystals does not appear to be a definite chemical compound. It does not ferment, melts 163-184°, and appears related to glucuronic acid and the pentoses.

D. D. VAN SLYKE.

Rapid detection of boric acid in butter and milk. M. E. GAUVRY. Ann. chim. anal., 15, 14.—Treat 10 grams butter with 20-25 c. c. warm water and shake well. After the butter layer separates, filter the aqueous part and collect the filtrate

in a centrifuge tube. Add 7-8 drops $\text{Ba}(\text{OH})_2$ and 10 c. c. EtOH (EtOH is unnecessary unless only traces of boric acid are present). Allow to stand a few minutes and centrifuge. Decant the supernatant liquid and pour 1 c. c. of a hot concentrated solution of oxalic acid on the precipitate, shaking continually. Ba oxalate dissolves in the excess of $(\text{COOH})_2$ and reprecipitates on addition of EtOH . Centrifuge again, decant the clear liquid into a porcelain evaporating dish, evaporate at a temperature below 55° after adding a few drops of alcohol tincture turmeric. A red color appears at first on the edge of the dish and spreads over the entire mass as the evaporation nears completion. The reaction is sensitive to 0.1 milligram boric acid. The color varies from pale pink to bright red, depending on the amount of boric acid. In the absence of H_3BO_3 a pale yellow color is obtained. In the case of milk the ash may be treated with a drop of HCl and a few cubic centimeters of warm water. The solution may then be treated as described above.

P. B. DUNBAR.

PATHOLOGY AND BACTERIOLOGY.

Passed Asst. Surgs. O. J. MINK and F. M. SHOOK, U. S. Navy.

C. HALASZ, A., *Changes in the pancreas in diabetes.* Wien Klin. Wschr., 1919, S. 1481.

The author believes that the areas of Langerhans are in etiological relation to diabetes. He divides the changes in the areas into two groups, in one of which the blood-vessel walls are altered and in the other they are normal. The first group is seen in old, the second in young, diabetics. In 25 cases the author found the pancreas smaller than normal, in 3 cases of diabetes it had its normal weight. In severe cases of diabetes in young individuals the pancreas is usually much reduced in size, the greatest reduction, however, taking place in old diabetics, in whom it consists mostly of connective tissue. In 44 cases there was not a single case of acute pancreatitis with diabetes. Five times the parenchymatous tissue and islands of Langerhans were normal, in a single case, besides normal parenchymatous tissue, there were typical and marked changes in the islands. In 3 cases there were marked changes in the parenchymatous tissue similar to those in the islands. In 17 cases the count of the islands showed them to be below normal in number. Atrophy was often found combined with colloid degeneration and sclerosis. Hemorrhages into the islands were found in 3 cases only. Regeneration of the islands was seen twice. In young individuals in whom the disease had taken a rapid course the pancreas was mostly small, on account, however, of congenital hypoplasia of the pancreas. In old diabetics, the pancreas was smaller than normal on account of the sclerosis of the parenchymatous tissue and the islands. The blood-vessel walls were frequently affected (11 out of 14 diabetics over 40 years of age). These blood-vessel changes involved either the islands alone or the

whole pancreas. Between these two groups of diabetics there is a third form, which can be classified as a mixed variety.—(F. M. S.)

HESS, OTTO. **The Cammidge reaction.** Deuts. Med. Woch., 1910, No. 2.

The investigator has studied 50 reactions, 25 in animal experiments and 25 in clinical cases. In normal dogs the reaction is positive very rarely and recognizable only by the microscope. In partial or total experimentally produced pancreas necrosis and fat necrosis the reaction was positive in half the cases. In experimentally produced chronic pancreatitis the reaction was weak and transitory in one case. In 10 cases of diabetes, of which 2 showed changes in the pancreas at autopsy, the reaction was negative. In 2 cases of cyst of the pancreas the reaction was negative, and in a third a positive reaction was given, which disappeared with the draining of the cyst. In this case the reaction was given by the contents of the cyst. In 3 cases, in which clinical symptoms pointed to a pancreatic affection, there was a strongly positive reaction.—(F. M. S.)

WHIPPLE, G. H. **Acute pancreatitis and urinary findings.** Johns Hopkins Hosp. Bul., Vol. XXI, No. 231.

The author, with three coworkers, in a series of careful experiments discovered that they could produce the so-called Cammidge test at will in dogs by the injection of disintegrated or hydrolyzed tissue. Routine examination of the urines of normal dogs, in dogs recovering from operations not involving the pancreas, showed a positive reaction. One case of leukæmia in a patient who afterwards came to autopsy gave a positive reaction. Examination of the pancreas showed no changes. They summarize their results as follows:

It is evident from our experiments that the Cammidge test is not specific for acute or chronic changes of the pancreas. The disintegration of any cells in the body may give the reaction, or even artificial hydrolysis of any animal tissue may give substances which will appear in the urine and give the characteristic crystals. It is possible that the disintegration of the polymorphonuclear leucocytes is an important factor in the production of this unknown substance. Determination of the melting point of purified crystals does not correspond with the reports given by Cammidge. The melting point was found at about 140°.—(F. M. S.)

COCA, F., and GILMAN, P. K. **The specific treatment of carcinoma.** Philippine Jour. Science, December, 1909.

The authors injected carcinomata, ground and extracted with salt solution, into the same patients from whom the tumors had been removed. Their series of cases is not long enough to draw definite

conclusions as to the permanent value of the results obtained, but the latter were extremely encouraging. They summarize their results as follows:

1. The protoplasmic substances of malignant epithelial tumors in human beings can be injected subcutaneously in large quantities without injurious results.

2. In three cases affected with carcinoma, such injections have been followed by the softening and disappearance of tumor masses measuring in diameter from 2 to 4 cm.

In a fourth case, a rapidly growing lump appeared near the site of the excised cancer two days after treatment. Several days later, when the lump had reached a diameter of 4 cm., the growth ceased and subsequent microscopic examination showed it to be a firmly encapsulated mass of dying epithelial-like cells.

Three other surgically inoperable cases, in two of which visible amounts of cancer tissue were left unexcised, have remained until now, i. e., for from five weeks to six months, free from recurrence of the disease.

Seven other cases have remained free from a return of the disease from one to seven months. Two of these were designated as "curable by operation;" three were designated as "probably curable by operation," and two were designated as "of doubtful curability by operation."

In only one case has the disease returned after treatment. In this case the material used for vaccination was rendered inert by too vigorous disinfection.

Hitherto no case of sarcoma has come to treatment; however, in view of the failure of the procedure to affect the course of Hodgkin's disease, the outlook for sarcoma is not promising.

3. Tumor cachexia is not increased by the rapid absorption of large quantities of tumor tissue; on the contrary, large injections of tumor material seem to cause the disappearance of the cachexia.—(F. M. S.)

ELLERMAN, V., and ERLANDSEN, A. Concentration method for tubercle bacilli. *Zeitschrift f. hyg. u. infect. krankh.* Bd. 61, S. 219-246.

After a large number of experiments, the authors report the following as being the best concentration and digestion method for demonstration of the tubercle bacillus in sputa in which few bacilli are present:

1. 10-15 c. c. sputum are mixed in a corked container with 0.6 per cent of Na_2CO_3 solution and the mixture put in the incubator at 37° for twenty-four hours.

2. The overlying fluid is decanted and the remainder is centrifuged. After centrifuging, the overlying fluid is again decanted.

3. The sediment is shaken up and gently heated with 0.25 per cent NaOH, in the proportion of 4 volumes of the latter to 1 volume of the sediment.

4. Centrifuge again and stain sediment in the usual manner.—(F. M. S.)

LIEBERMEISTER, DR. G. Ueber die nach Ziehl nicht darstellbare Form des Tuberkel-bazillus. (From the Academy for Practical Medicine in Cologne.) Deutsche Med. Wochenschr.; No. 28, 15 July, 1909, p. 1224.

It has long since been noted that no tubercle bacilli could be demonstrated in tuberculous masses nor even in sputum in cases in which, nevertheless, undoubted tuberculosis did exist. Much and others have shown that there are forms of tubercle-bacilli that are not demonstrable with Ziehl's method but by Gram's method. Much believes in a special granular form of tubercle bacillus and is, moreover, of the opinion that tubercle bacilli stainable according to Gram, especially their granules, are diagnostically significant.

According to Liebermeister and others, however, these granules are not peculiar to the tubercle bacillus, but are found in many different kinds of bacteria and correspond to the granules known as Babes-Ernst granules. Just as there are granules in the bacillus diphtheriae so also may they be found in the tubercle bacillus of normal constitution. The reason why they are not rendered visible in tubercle bacilli in Ziehl's preparation is that the Ziehl stain only shows the waxy envelope of the tubercle bacillus which covers the body of the bacillus. The granules are the most resistant portion of the bacillus, although not to be compared to spores.

The great practical importance of Much's investigations consist in his having shown that tubercle bacilli and their granules may be stained by the Gram method at a time even when the Ziehl method fails—that is, after the waxy envelope of the bacillus has been lost—while both granula and bacilli remain, and that these granula are so resistant in a chemical sense that they survive even the bacilli themselves.

L. sums up his conclusions as follows:

(1) Tubercle bacilli contain, as a rule, granula, and these granula are so resistant as to persist even after the bacilli are no longer demonstrable. (2) Since granula are contained in a whole series of other bacteria, mistakes are possible. (3) Gram positive bacilli and granular bacilli are diagnostically valuable when the presence of other bacteria can be excluded.—MEDICAL INSPECTOR H. G. BEYER.

SCHNITZER, DR. ASSISTENZARZT. Nachweis u. Bedeutung der Tuberkelbazillen, in Stroemendem Pthisikerblut. (The presence and significance of tubercle bacilli in the blood of consumptives.) Deutsch. Med. Wochenschrift, No. 36, September 9, 1909, p. 1506.

The author refers to the great difficulty of demonstrating tubercle bacilli in the living blood; he reminds us of the important communications made by Liebermeister to the Twenty-fourth Congress for Internal Medicine, and according to which L. had succeeded in demonstrating the existence of virulent bacilli in the histologically non-

tuberculous organs of tuberculous cadavers, by the transplantation of bits from such organs into guinea pigs. L.'s further researches on the living, showed that in a relatively large percentage of cases of advanced phthisis the presence of tubercle bacilli could be demonstrated when the blood of such patients was injected into guinea pigs; thus, within the last twenty days of life, in 75 per cent; twenty-one to eighty days before death, in 50 per cent, and more than eighty days before death in 35 per cent of the cases; classified according to stages of pulmonary tuberculosis, in 60 per cent of the third stage, and in 30 per cent of the second stage.

Employing the slightly modified method of Stäubli in his examination of blood for tubercle bacilli, he found tubercle bacilli as shown in the adjoining table.

Seat of tuberculosis.	Number of cases.	Positive.	Per cent.
Pulmonary:			
Third degree	17	8	47
Second degree	9	2	22
First degree	8		
Other organs	4	2	50

In 34 cases of pulmonary tuberculosis he succeeded in showing the presence of tubercle bacilli in the blood, with the method of Stäubli, 10 times; 8 times out of 17 cases of advanced phthisis, twice in the case of the second stage (Gerhard-Turban). In a case of tuberculosis of the testicle and bladder, tubercle bacilli circulated in the blood. The lungs showed no evidence of active tuberculosis. After castration, the bacilli disappeared from the blood, or rather could no longer be found, although plentifully present in the urinary sediment. In 8 cases of phthisis of the first stage no bacilli could be found in the blood at all. The results are prognostically as well as diagnostically important. Both Liebermeister and Schnitter found that the number of positive findings went hand in hand with the gravity of the disease. With one exception, all the cases in which bacilli had been shown to exist in the blood were dead within a few weeks or months from the time of the examination. In advanced cases of phthisis, therefore, the finding of tubercle bacilli in the blood may be considered a "signum mali ominis."—MEDICAL INSPECTOR H. G. BEYER.

SCHULZ, EDWARD, Dr. **Ueber die granulare Form des Tuberculosevirus im Lungenauswurf. On the granular form of the tuberculosis virus in the sputum.** (From the International Sanatorium of Doctor Phillipi in Davos-Dorf.) *Deutsche Med. Wochenschrift*, No. 36, 9 September, 1909, p. 1569.

Schulz's observations would apparently support the diagnostic significance of the granules of Much, who, from his own observa-

tions, came to the conclusion that the observed granules were not a product of degeneration, but represented a stage in the development of the bacillus. He distinguishes (1) the acid-fast bacillus, stainable according to Ziehl; (2) the nonacid-fast bacillus, and (3) the granular form; both of the latter forms are Gram positive. The granules represent the more resistant forms of the tubercle bacilli and persist after the bacillary, Ziehl-positive forms have disappeared.

Schulz undertook to stain tuberculosis sputum according to Stäubli's modified Gram method II:

Methyl violet B. N. 10 c. c. sat. alcoholic sol. in 100 c. c. of a 2 per cent carbolic acid watery solution (boiling over flame).

KI-iodine solution, 5 minutes' rinsing in water.

5 per cent nitric-acid solution, 1 minute.

3 per cent HCl solution, 10 seconds.

Decolorization in acetone-alcohol (ana) after constant shaking, and thorough rinsing in water.

Schulz found in every sputum in which tubercle bacilli could be demonstrated by Zeihl's method round granules, either singly or scattered, some in the form of bacilli, but all showing the same dark blue tint. He refers to Freimuth (Breslau) and Kremser (Sulzhayn), who had, before him, made the observation, while conducting daily examinations of sputum, that tubercle bacilli would suddenly disappear in the sputum and remain absent for weeks and months, and that after an interval the bacilli would recur without any apparent cause.

Schulz had made the same observations, and now began to stain such Ziehl-negative sputum with the Much-modified Gram method II, and in every case found the above-mentioned granules. He gives the histories of five cases, all of which would support the view that the disappearance of Ziehl-positive bacilli and the appearance in the sputum of the more resistant Gram-positive granules would signify improvement.

Schulz believes himself justified in assuming that tubercle bacilli take on the more resistant form of granules (Gram-positive) owing to the influence upon tubercle bacilli of the immune bodies of the organism. When the organism is strong enough to produce sufficient immune bodies the Ziehl-positive bacillus disappears from the sputum and remains absent until, for some reason not always apparent clinically, it reappears. In patients with progressive foci in the lungs such intervals of freedom from bacilli in the sputum do not occur, because the organism is not in a condition for producing the necessary amount of antibodies.--MEDICAL INSPECTOR H. G. BEYER.

CLEGG. The cultivation of the leprosy bacillus. Philippine Jour. Science. December, 1909.

Attempts were made to cultivate the bacillus from cutaneous nodules in 10 cases. In 8 cases an acid-fast bacillus was found to multiply in symbiosis with amœba and bacteria. Control amœba plates were negative for acid-fast organisms. By heating the amœba-cholera-leprosy plates to 60° for half an hour and inoculating an ordinary media, the organism was obtained in pure culture. Guinea pigs inoculated with pure culture developed lesions somewhat resembling leprosy. Acid-fast organisms were found at the site of inoculation and in one case in the spleen. They were once recultivated from the lesion in the pig.—(O. J. M.)

CROSSONINI, DR. E. Ueber den Nachweis von Indol in den bakteriischen Kulturen mit der Ehrlich'schen Methode. On the detection of indol with the method of Ehrlich. (From the hygienic institute of the University of Genoa.) Arch. f. Hygiene, Bd. 72, Heft. 2, 1910, p. 161.

It is a well-known fact that the indol reaction is of considerable practical importance in bacteriological diagnosis, especially in the differentiation between the bacilli of the typhoidal and paratyphoidal group and those of the bact. coli group. Crossonini proposed to investigate, in more detail than had been done before, the method of Ehrlich, which had at first been proposed for the detection of indol in urine, but later applied to bacterial cultures as well by Böhme, Steensma, and Marshall. The two solutions used in this method are:

	Parts.
Solution I. Paramethylamido-benzaldehyde.....	4
Absolute alcohol.....	380
Hydrochloric acid.....	80
Solution II. Saturated sol. of potassic sulphate.	

To 10 c. c. of the culture of a certain micro-organism in bouillon 5 c. c. of each one of these solutions are added, the mixture shaken, and, if indol is present, a rose color appears, increasing in intensity up to an hour.

This method has proved to be not only much more sensitive than the old method of Salkowski, but admits of a quantitative determination of indol by the colorimetric method.

With the object in view of testing the comparative value of the two methods, the author subjected 18 different micro-organisms, all belonging to the group "vibrio" to an accurate study. His tables clearly show that, with the new method, the presence of indol in bacterial cultures may be detected two hours after starting the cultures, while with the method of Salkowski it takes from fourteen to forty-eight hours before the presence of indol is discovered.

With the old method, a dilution of indol of 1:200000 is scarcely positive while, with the paramethylamido-benzaldehyde method, a distinct and unmistakable rose-color may be seen in a dilution of 1:1,000,000. The reaction can be made still more sensitive when the test solution and the bacterial culture are not allowed to mix and when the former is added so that the two only come in contact. A rose-colored ring is then formed at the point of contact of the two fluids, even in a solution of indol of 1:5,000,000.

In some further experiments the author was able to show that a slight indol reaction appeared with the old method, where none was expected and where, indeed, no such reaction occurred with the new method, apparently indicating that such a reaction could not depend upon the presence of indol, but must be due to other substances (skatol).

By means of a carefully prepared color scale, the author was able to see the hourly production of indol in the different bacterial cultures with great accuracy and to note, at the same time, that the quantity of indol produced varied with the different bacteria, the production lasting up to fifteen and twenty hours, after which time it began to diminish. The results obtained by the author proved to be as accurate as when distillation was employed, so that the process of distillation ceases to be necessary for the obtainment of accurate quantitative results, an advantage not to be underestimated in laboratory work.

The author concludes: (1) That the method of Ehrlich in the determination of indol in bacterial cultures is preferable to that of Salkowski: it is quick, permitting to make a diagnosis in two to four hours: its results are accurate and constant, giving reactions with indol only and not with other substances. (2) That the method may be used for quantitative determinations of indol without resorting to distillation.—MEDICAL INSPECTOR H. G. BEYER.

CLARK. The relation of the Pseudo-Diphtheria and the Diphtheria Bacillus. Jour. Infectious Diseases, May 20, 1910.

The author cites the previous work on this subject and then gives in detail his own observations. He considers the two organisms to be distinct and recommends for the sake of clearness that the name of *B. hofmanni* be substituted for the term *pseudo-diphtheria bacillus*. He summarizes all his work in the following conclusions:

1. Solid staining types are not more prevalent at the end than at the beginning of a case of diphtheria.
2. Successive passages of *B. hofmanni* through guinea pigs, chickens, pigeons, or canaries produce no effect either on the animals or on the organisms inoculated.

3. Doses as large as 7 per cent of the body weight of half grown or young guinea pigs do not kill the animals nor change the type of *B. hofmanni*.

4. Guinea pigs inoculated with cultures of *B. hofmanni* sensitized with homologous serum show no unusual effects.

5. *B. hofmanni* grown in an increased supply of oxygen shows no biochemical or morphological change.

6. By using celloidin sacs it was found that long continued growth in the body cavity of guinea pigs either alone or together with *B. diphtheriae* or *Aurococcus aureus* does not change *B. hofmanni*.

7. *B. hofmanni*, inoculated into animals in combination with toxin either directly or in celloidin sacs, exhibits no change in the cultures recovered.

8. Artificial selection on the basis of morphology does not change the form of *B. hofmanni*.

9. Solid-staining forms are common to both *B. hofmanni* and *B. diphtheriae* during the first eight to twelve hours of growth. Occasionally, however, these types are retained by the *B. diphtheriae* for much longer periods and some strains of *B. hofmanni* may show barred types on long incubation.

10. The frequency curves of acid production of *B. hofmanni* and *B. diphtheriae* showed marked differences.

11. We would suggest that the term *pseudodiphtheria bacillus* be discarded for the less perplexing one of *B. hofmanni* and that the symbol D^2 be restricted to those organisms of the correct morphology which produce acid and diphtheria toxin.

12. From a careful study of the literature and from the experiments described in this paper, we are forced to take the position that the *pseudodiphtheria bacillus* or *B. hofmanni* belongs to a different species from the Klebs-Löffler bacillus. Doubtless both organisms do belong to the same group and came from common ancestors, but the differences seem to be sufficiently constant to place them in separate species.—(O. J. M.)

ANDERSON, J. F. The influence of age and temperature upon the potency of antidiphtheritic serum and antitoxin globulin solution. Jour. Infectious Diseases, May 20, 1910.

The following conclusions are reached:

The average yearly loss in potency of diphtheria antitoxin at room temperature is about 20 per cent, at 15° C. about 10 per cent, at 5° C. about 6 per cent, although in some instances these percentages may be much increased.

As a result of this work there appears to be but little difference in the keeping qualities of untreated sera and sera concentrated by the Gibson process.

Diphtheria antitoxin to be placed on the market and there kept under unknown conditions should not be labeled with a return date longer than two years and should contain an excess of at least 33 per cent to allow for decrease in potency; in addition, when the serum is sold in syringes with an absorbable piston, an excess should be added for this loss.

Dried diphtheria antitoxin kept in the dark at 5° C. retains its potency practically unimpaired for at least five and one-half years.

The lack of confidence in the therapeutic properties of old sera is without basis as such sera, unit for unit, are as potent as new sera.

The protective value of diphtheria antitoxin is in exact accord with its unit value and is independent of the volume of the serum or other properties in the serum.—(O. J. M.)

HAMILTON, ALICE. **The value of opsonic determinations in the discovery of typhoid carriers.** Jour. Infectious Diseases, May 20, 1910.

The author summarizes her work as follows:

Among 24 cases of chronic cholecystitis, 5 paratyphoid carriers were found, 1 typhoid carrier, and 1 with both organisms.

Five, or 71 per cent, agglutinated their own bacilli or stock strains or both, in dilution of 1:50 or higher. No noncarrier agglutinated any strain in dilution as high as 1:50.

All 7 had an abnormal opsonic index to their own bacilli or to some stock strain or to both. In cases with acute symptoms the index fluctuated, falling below normal at times and again rising very high, while in cases free from acute symptoms the index was persistently high, never falling to normal.

Where mixed infection by two organisms existed, agglutination and an abnormal opsonic index for both organisms were found. In one carrier, and in one case of paratyphoid fever, mixed infection was suspected because of the high opsonic index to the two organisms, but it could not be proven.

The opsonic index is a very valuable aid in the discovery of bacillus carriers. No decidedly abnormal index was found in any of the noncarriers.

No proof of increased bactericidal power in the serum of carriers was found, nor any proof of increased resistance to bacteriololysis on the part of the carrier's strain. Neither was there any evidence of a greater opsonic power in the carrier's serum toward his own strain, but in three cases the carrier's strain was markedly resistant to phagocytosis.

The statement that a paratyphoid infection frequently follows or accompanies a typhoid infection was apparently confirmed by the study of these carriers.

A close relation exists between the members of the typhoid-colon group, as can be seen by group agglutinins and group opsonins and by the frequent occurrence of mixed infections.—(O. J. M.)

TORREY and RAHL. **The distribution of bacteria in bottled milk and certain controlling factors.** Jour. Infectious Diseases, May 20, 1910.

The authors' conclusions are as follows:

1. The upper 2 ounces of the cream of fresh bottled milk of fair quality contain, on the average, 50 to 100 per cent more bacteria than an equal amount of the lower cream. In older and more grossly contaminated milk the lower cream may embody as many as or even more bacteria than the upper layers.

2. By removing these two top ounces from a milk bottle and using the remaining top milk (8 ounces) for infant feeding, as Hess has suggested, there generally results a reduction of from 30 to 50 per cent in the bacterial count.

3. The dominant controlling factor in the primary disposition of bacteria in a milk bottle is the upward "rafting" activity of the fat globules. A higher percentage of bacteria are brought to the surface layers in a milk rich in cream than one poor in that substance.

4. At ice-box temperature the rate of increase in bacteria in the cream and that in the skim milk are practically identical. As the temperature is elevated the rate of multiplication in the skim milk outstrips that of the cream until, at 30° C., it may be many times as rapid.

5. In certain samples of rather highly contaminated milk the abrupt change in the temperature of the environment from 5° to 30° C. caused a striking

bacteriolysis in both the cream and the skim milk. This was probably an expression of bacterial antagonism.

6. The sediment portion of the average bottle of fresh milk contains frequently fewer bacteria than any other region of the fluid. A marked excess of bacteria in the sediment indicates that the milk is old or that it has been kept in a warm place.—(O. J. M.)

CLIFFORD, A. B. **Are acid-fast bacteria other than the tubercle bacillus commonly met in clinical laboratory work?** New York Med. Jour., April 9, 1910.

The author concludes as follows:

1. Acid-fast organisms, other than the tubercle bacillus, are rarely met with in clinical laboratory work.
 2. Such organisms, as a contamination of distilled water, are a negligible factor in staining for the tubercle bacillus.
 3. When, in the examination of tuberculous patients, or those suspected of being tuberculous, acid alcohol fast organisms having the morphology of the tubercle bacillus are found, after having stained by the previously mentioned method, we are fully justified in making a diagnosis of tuberculosis.—(O. J. M.)
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E. BURVILL HOLMES. **Acid-fast organisms in waters.** New York Med. Jour., April 9, 1910.

The author examined 16 samples of distilled, filtered, and spring water and found acid-fast organisms in 11. They differed from the tubercle bacillus in being decolorized by either a 25 per cent solution of sulphuric acid or nitric acid in 95 per cent alcohol. They were noncultivable and morphologically resembled an atypical tubercle bacillus.

The conclusions are:

1. All waters may be infected, especially if old and exposed to the air.
 2. Failure to decolorize with Pappenheim's solution does not imply that the bacillus in question is a tubercle bacillus.—(O. J. M.)
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HARTWELL and STREETER. **The treatment of infection of the urinary tract with bacterial vaccines.** Boston Med. and Surg. Jour., March 31, 1910.

The authors' experience leads them to the following conclusions:

1. They are efficient in relieving symptoms in mild forms of cystitis, but have less marked effect on pyuria.
2. They are without value in severe forms of cystitis.
3. They probably hasten the recovery of pyelitis.
4. They have no influence on bacteriuria.—(O. J. M.)

HAMM. The *B. fecalis alkaligines* pathogenic for man. Munch. Med. Woch., February 1, No. 5, L VII.

Primipara, 29 years, fatal puerperal pyelonephritis and peritonitis with the bacillus in pure culture in urine and pus.—(O. J. M.)

CUMMINS, FAWCUS, and KENNEDY. Treatment of typhoid carriers. Jour. R. A. Med. Corps, April 19, 1910.

Carriers are placed in 4 groups:

Group I. Pure intestinal cases. Bacilli only excreted in the feces.

Group II. Urinary cases. Bacilli excreted only in urine.

Group III. Intestinal cases with symptoms of inflammation in the gall bladder. Bacilli located in gall bladder, excreted in the feces.

Group IV. Mixed intestinal and urinary cases. Bacilli in the feces and urine.

The results of treatment are summarized as follows:

1. Lactic acid bacilli have failed to diminish the excretion of bacilli in fecal cases.

2. Attempts to cure typhoid bacilluria by acidifying the urine have not been successful.

3. The administration of antiseptics has invariably brought about a decided diminution in the number of bacilli excreted, both by fecal and urinary carriers. This effect is much more marked when the maximum "contact" of antiseptic with bacilli is brought about by combining the treatment with low diet and aperients in the case of "fecal," and diuretics in the case of "urinary" carriers.

4. The use of X rays, especially in cases with gall-bladder symptoms, seems to have a definite beneficial result. I speak with diffidence, as my experience is limited to one such case; and it must be remembered that his history shows a long intermission in the passage of typhoid bacilli, a few months before the X-ray treatment was tried.

But the disappearance of the bacilli from stools on two occasions following the use of X rays and freedom from recurrence for considerable periods after cessation of the treatment suggest that Private L. was really benefited by the X rays; while the charts of the other two cases also point to improvement under this treatment.

5. Lastly, it seems possible that treatment by a vaccine, though unsuccessful when tried alone in the cases now under discussion, would have a better chance if combined, in the case of urinary carriers with diuretics, and in gall-bladder cases with X-ray treatment.

As has often been pointed out by Sir Almroth Wright, a vaccine is more likely to be efficient when the local conditions are so altered as to permit of the fullest possible contact between the bacteriotropic substances in the blood and the bacteria involved.—(O. J. M.)

GRATTAN. A preliminary inquiry into the prevalence of paratyphoid fever in London, with remarks on blood culture in 48 cases of enteric fever. Jour. R. A. Med. Corps, April, 1910.

The work is summarized as follows:

1. Cultures were made from the blood of 60 suspected cases of enteric fever; 12 of these proved not to be enteric (tubercle, appendicitis, influenza, middle-ear disease, etc.). The blood cultures were positive in 26 out of the 48 cases of enteric.
2. The *B. typhosus* was the only member of the typho-colon group which was recovered from the blood of the 26 positive cases.
3. A diagnosis of paratyphoid fever, based on an examination of the stool only, is unreliable.
4. Plain sterile bile (Kaysers' method) gave the best results.
5. The action of the *B. typhosus* on dulcitol is variable; a recently isolated typhoid bacillus may ferment dulcitol.
6. A strain of *B. typhosus* when first isolated fermented raffinose in thirteen days, and in forty-eight hours after subculture.
7. A recently isolated true typhoid bacillus may fail to be agglutinated by an antityphoid serum.—(O. J. M.)

MEDICAL ZOOLOGY.

Passed Asst. Surg. P. E. GARRISON, U. S. Navy.

LEIPER, ROBERT F., M. B., F. Z. S. Guinea worm in domesticated animals, with a note of its discovery by Mr. Charles Grey in a leopard. Jour. of Trop. Med. and Hygiene, London, vol. 13, No. 5, p. 65-66, March 1, 1910.

Leiper reviews numerous cases in the literature of the guinea worm reported for other animals than man. Considerable doubt has been entertained concerning the specific identity of these worms with *Dracunculus medinensis*, the human parasite. The author reports upon his examination of the specimens collected from a leopard in northwest Rhodesia that, though both extremities are lacking, the body of the worms and the embryos appear to agree in every particular with *D. medinensis* and quotes the determinations of Osman and Railliet upon the parasite of the dog and that of Cobbold upon guinea worms found in the horse as further substantial evidence that the guinea worm of man is able to infect these if not all the domesticated animals.—(P. E. G.)

BOYCE, RUPERT, F. R. S., and LEWIS, F. C. The effect of mosquito larvæ upon drinking water. Annals of Tropical Med. and Parasit., Liverpool, vol. 3, No. 5, March 21, 1910, pp. 591-594.

Contrary to what has popularly been believed, the authors have shown by a series of experiments that the presence of mosquito larvæ in water not only does not tend to lessen the number of bacteria in

water, but that the bacterial content of the water is increased. Flask A., nonsterilized drinking water without larvæ, and flask B. the same water, with larvæ, gave 880 and 873 bacteria per c. c. respectively, the first day; three days later A without larvæ, gave 1,420 bacteria per c. c., while B with larvæ gave 2,590. Thereafter the bacteria in A decreased and in B increased, so that on the eighth day, flask A. without larvæ gave only 35 per c. c., while Flask B with larvæ gave 9,370. Three other series of flasks gave like results, while in another series typhoid bacilli were used and these organisms multiplied more rapidly and persisted longer in the water containing mosquito larvæ than in that without larvæ. A species of *Culex* and *Theobaldia annulata* were the mosquitoes used. The authors conclude that the presence of mosquito larvæ in water still further pollutes it and affords additional nutritive material for the bacterial organisms.—(P. E. G.)

FENWICK, SOLTAN W., M. D. The existence of living creatures in the stomach as a cause of chronic dyspepsia. The British Med. Jour., February 12, 1910, pp. 371-375.

The author has collected over 180 cases in which lizards, salamanders, beetles, larvæ, frogs, slugs, caterpillars, worms, leeches, chrysalides, or maggots were believed to have been harbored in the digestive tract for a considerable period and accompanied by an intractable form of dyspepsia. While many of these cases are fraudulent or the result of hysteria or careless observation, he considers some of them to be so well authenticated as to merit more attention than has hitherto been accorded the subject. Among animals reported to have lived a considerable time in the stomach or intestine of man the following are cited:

Insect larvæ, chiefly of the *Diptera*, or two-winged flies, but also of the *Lepidoptera* or butterflies and moths and of the *Colloptera* or beetles. Of the dipterous larvæ reported passed in feces or vomited, the greater number are of the *Muscidae*, including the common house fly (*Musca domestica*), blow flies (*Vomitoria*), and flesh flies (*M. carnaria*). Larvæ of *Anthomyia* (fruit and flower flies), *Tipula* (crane flies, two apparently authentic cases), *Eristalis* (drone flies) have also been reported. At least one instance has been related of the vomiting of an immense number of the ova and larvæ of mosquitoes (*Culex pipiens*). Several cases are recorded of persons vomiting the larvæ of bot-flies (*Gasterophilus equi*) which infest the stomach of horses. At least 24 varieties of the *Colcoptera* or beetles have been identified in the vomit or evacuations of persons suffering from symptoms of gastro-intestinal irritation and over 40 cases are recorded. In the great majority of cases the beetles apparently belonged to the *Staphylimidae* (rose beetles), *Carabidae* (ground beetles) or the *Blaptidae*, the latter having been noted in nine cases.

The *Lepidoptera* are less frequently found. Some 22 parasitic caterpillars have been reported. The chrysalides of butterflies have been observed once as the cause of a severe gastro-enteritis, while a similar condition has been reported due to fleas and to wood lice inhabiting the alimentary tract.

The author considers that the clinical details of many of these cases furnish conclusive proof that under certain conditions the eggs of insects are hatched in the human stomach and the resulting larvæ grow to their full size and even goes so far as to state that "in rarer instances all the metamorphoses which precede the development of the perfect insect may be completed in the organ." These conclusions he considers to some extent confirmed by experiments with insects in the stomach of animals and in artificial acid and digestive fluids. He recognizes an incubation period of from four to twelve days between the ingestion of the eggs and the appearance of the first symptoms. The latter vary in severity according to the kind and degree of infection. A sharp purge is often efficient in removing the larvæ, while in more troublesome cases, thymol, santonin, or other anthelmintics often have been successful. Beetles are very difficult to kill and in two cases noted it was only by enormous doses of turpentine that the pests were removed.

The author reviews numerous cases in which slugs, lizards, earth-worms, leeches, various amphibians, and snakes, have been reported to have lived a more or less extended time in the human stomach.—
(P. E. G.)

STILES, CH. WARDELL, and GOLDBERGER, JOSEPH. **A study of the anatomy of *Watsonius* (n. g.), watsoni of man and of nineteen allied species of mammalian trematode worms of the superfamily Paramphistomoidea.** Bul. No. 60, Hyg. Lab., U. S. P. H. & M. H. S., Wash.

Attention is called to this comprehensive study in a group of worms which have heretofore been less thoroughly worked over than some of the other trematodes. After a thorough study of new specimens and a reexamination of old material, the authors are led to a rearrangement of the classification of the mammalian amphistomes and to the erection of 14 new species and 15 new genera or subgenera. The old families *Fasciolidæ* and *Paramphistomidæ* are raised to superfamily rank, *Fascioloidea* and *Paramphistomoidea*, and the latter is subdivided into three families, *Gastrodiscidæ*, *Gastrothylacidæ*, and *Paramphistomidæ*.

Two parasites of man occur in the group under consideration. Specimens of *Gastrodiscus hominis* (Lewis and McConnell) were not studied, but *Gastrodiscus* is made the type genus of the new family, *Gastrodiscidæ*. The genus *Cladorchis* is subdivided, the human parasite, *C. watsoni* (Conynham, 1904), being made the type and only species of a new genus *Watsonius*. According to this revi-

sion, therefore, the name of the African amphistome of man becomes *Watsonius watsoni* (Conynham, 1904) Stiles and Goldberger, 1910. Its position is in the subfamily *Cladorchiniæ*, family *Paramphistomida*, superfamily *Paramphistomoidea*.—(P. E. G.)

TROPICAL MEDICINE.

Surg. C. S. BUTLER, U. S. Navy.

PHALEN, J. M., Capt., U. S. Army, Med. Corps. **Yaws as a cause of chronic ulceration.** Bul. Manila Med. Soc., February, 1910

The author refers to a paper read by a physician before the society, in which reference was made to the prevalence of arterio-sclerosis. The writer attributed this to previous syphilis, stating that while primary and even secondary syphilis were rarely seen, tertiary manifestations were very common; this he judged to be the case from their clinical manifestations and their prompt response to the therapeutic test. This opinion seems to be largely held by medical men in the Philippines.

Phalen quotes a number of figures from the hospital reports to show that syphilis is relatively a rare disease among native Filipinos, although mutilations of a syphilitic-like nature are not uncommon. During two years of dispensary clinic practice, he has seen no more than half a dozen cases of secondary syphilis. This can not be accounted for from the standpoint of the Filipinos' carelessness in applying for treatment in the early stages. There is a large amount of specific infection among the American troops, while among the scouts the rate is very much lower, about as four to one, which the author thinks represents the relative frequency of syphilis among the general population of the two countries. It is no exaggeration that mutilating ulcerations are extremely common among the Filipinos (they can be numbered by the thousands). The author endeavors to identify these mutilating ulcerations as tertiary yaws. Syphilis and yaws are closely allied etiologically and from the standpoint of the symptomatology. They can, however, be shown as distinct entities. Yaws is rarely venereal; it is common among children; a rural disease rather than an urban one. Being similar to syphilis etiologically and in clinical course, it is reasonable to postulate similar sequelæ, hence the inferences that many of these mutilating ulcerations are due to yaws. Among 26 persons showing these mutilations, 19 when carefully questioned gave a history of previous yaws, and in 7 the scars were unquestionable. Six gave a history of ulceration following directly upon the yaws. In other cases these lesions appeared at varying times from two to sixteen years. In Batan rhinopharyngitis is rather common and is thought to be due to an invasion

of the nasal passages by yaw papules. The disease is locally known as "grano-maldite" and is the same as gangosa. This disease and yaws are well recognized in these islands. Syphilis is very rare.

The author details several cases showing the tendency of yaws to cause ulceration in the skin, following immediately upon infection. These he thinks are caused, some by the yaw virus itself, while others are aided by pus organisms. Whether or not there is a true tertiary yaws is an open question. The author is of the opinion that a large proportion of the chronic ulceration in the Philippines, together with the gangosa cases, are examples of this condition.

The practical bearing of this is that yaws should be looked upon as a serious disease in childhood and its treatment strenuously pursued.—(C. S. B.)

MANSON, SIR PATRICK. On the nature and origin of Calabar swellings. *Jour. Trop. Med. and Hyg.*, March 15, 1910.

Manson speaks of the puzzling nature and etiology of this peculiar condition. In an otherwise healthy individual, a large noninflammatory, œdematous swelling will appear suddenly on some part of the body. In a few hours, without any sign of any inflammation, it attains its maximum, and then during the next day or two slowly subsides without suppuration. In the subject this condition is likely to recur at irregular intervals during many years. It is doubtful if it ever occurs on mucous surfaces. The author suggests in this paper a probable method of production of the condition. The general opinion is that in some way the condition is connected with infection with *Filaria loa*. The frequency with which this parasite and these swellings are associated and the identity of their distribution point to this conclusion. In many cases of Calabar swelling neither *F. loa* nor its larval form, *micro-filaria*, can be demonstrated. However, in many cases *M. loa* is present in the blood and yet no *F. loa* has been seen crossing the eye or recognized under the skin. Conversely gravid *F. loa* are sometimes seen in the eye and yet no *M. loa* are found in the blood. Hence it may be concluded that the parasite may often be in the tissues without betraying its presence. Therefore, in those cases of Calabar swelling in which neither the adult nor larvæ have been detected, the parasite must nevertheless be present in some part of the body. It is not easy to explain why the larvæ can not always be demonstrated in the blood. It is a fact that gravid adults may show themselves from time to time and yet repeated blood examinations may fail to show up the larvæ. The absence of larvæ from the blood is then not a valid argument against the filarial origin of Calabar swelling. The adult worms usually cause no symptoms except slight itching when immediately under the skin.

Ordinarily they cause no swelling unless the part be scratched or irritated. Here the larvæ are emitted in the connective tissue and find their way into the lymphatics and so into the blood. The mere presence and movements of these worms do not ordinarily cause the characteristic œdema. The author thinks that these swellings must be produced in one of the following ways:

(a) By lymphatic obstruction. This I dismissed as untenable, seeing that the worm lies not in the lymphatic vessel, but, so to speak, free in the connective tissue.

(b) By some irritating glandular secretion emitted from time to time. This, too, I dismissed, as I failed to understand the object viewed from the standpoint of the interests of the parasite of such a secretion.

(c) By fecal discharges from the alimentary canal of the worm. This, too, I dismissed as unlikely, seeing that such discharges were probably of frequent occurrence, whereas Calabar swellings are relatively infrequent; nor could I see any objects in the interest of the parasite why nature should have endowed the feces of the animal with irritating properties.

(d) Lastly, by periodical and normal emptying of the contents of the uterus of the gravid female worm into the connective tissue of the host. This last was the hypothesis I favored because it appeared to me to conform with the interests of the parasite as well as to explain the phenomena of the disease. One can understand how a mildly irritating action, such as could be produced by the moving larvæ, would, by causing the effusion of a large quantity of serous fluid, assist the emitted larvæ to move along the now distended lymph spaces and be flushed into the lymphatics and so finally into the general circulation. It is well known that if a guinea worm, also a connective tissue parasite, be ruptured by indiscreet traction and her larvæ in vast numbers be discharged into the connective tissue she lies in almost immediately an œdematous swelling comparable in a sense to Calabar swelling results, provoked, doubtless, by the irritating properties of the larvæ or other contents of the uterus of the ruptured worm. The analogy seems to favor my speculation.

The author in a case of Calabar swelling which recently came under his observation attempted to demonstrate the correctness of this theory by withdrawing fluid from the œdematous swelling where it first made its appearance. The attempt was made to avoid as much as possible aspirating blood with this juice. This attempt was largely successful, as there were very few blood corpuscles in smears made from this juice. Two of these smears showed the presence of twenty *micro-filarial* loa.—(C. S. B.)

BOWMAN, F. B. Two cases of balantidium infection with autopsy. Philippine Jour. Sc., vol. IV, No. 6, December, 1909.

Infection with *Balantidium coli* is not very common in the Philippines, there occurring but 3 infections in 4,000 routine fecal examinations of prisoners in Bilibid. Three cases occurred among 300 patients which passed through the wards of the Philippine Medical School. One of these came to autopsy.

Summary.—Case 1 shows particularly the earliest stages in the ulcerative process caused by the *Balantidium coli*. Case 2 demonstrates particularly the latter stages of ulceration and also that this process can proceed to the stage of perforation with resulting general peritonitis and death. This case, however, never reached the stage of advanced general peritonitis, for at the time of perforation there occurred a severe hemorrhage, the patient losing a liter or more of blood, and this, with the shock of the perforation in his weakened condition, caused almost immediate death.

In 1904 Strong collected from the literature all the cases of *Balantidium coli* infection (127 in number) reported up to that time. In two of these cases death occurred from general peritonitis. Its presence in the mesenteric lymph glands in the second case reported in the present paper is peculiar to this case and has not been described before.

In Strong's series none of the cases showed abscess of the liver, and in only one was the parasite reported as being present in the sputum from a case with an indefinite diagnosis of abscess of the lung. The parasites are very frequently situated in the lymph spaces and in the blood vessels of the submucosa, but they do not appear to have caused inflammatory conditions elsewhere in the body. As has been stated, some of the mesocolic lymph glands in the second case showed areas of inflammatory change and of necrosis. On account of its size, wherever the parasite enters, the intestinal bacteria would also have an opportunity of entering and of causing inflammatory changes. However, bacteria were not definitely discovered in sections of these glands. In this connection it is interesting to note that Glaessner in extracts of *Balantidium coli* in the feces was able to demonstrate a very active diastase and a fairly strong hemolytic substance, although the extracts were inert with respect to dilute albumen, peptone solution, and to fibrin.

Conclusions.—1. The intestinal lesion in both of these cases seems to have been caused by *Balantidium coli*.

2. Death may result from perforation in severe *Balantidium coli* ulceration.

3. The presence of the parasite is not always limited to the walls of the intestine. The organism may invade the mesocolic intestinal lymphatic glands.—(C. S. B.)

HYGIENE AND SANITATION.

Medical Insp. H. G. BEYER and Surg. F. L. PLEADWELL, U. S. Navy.

GAEHTGENS, Dr. WALTER. Die Händedesinfektion bei Typhusbazillenträgern. (Hand disinfection in bacillus carriers.) Arch. f. Hygiene, 72 Bd., 3 Heft, 1910, p. 233.

The experience gained during the last few years in the south-western portion of the German Empire with typhoid has shown that, in very many cases, the infection is traceable to healthy persons who carry typhoid bacilli in their bodies more or less permanently. As a general rule, these bacillus carriers have suffered from typhoid fever at some former period. In such persons clinical recovery did not occur in a bacteriological sense, and the excretion of typhoid bacilli from their bodies continues for months and even years after their convalescence. Consequently such persons are a permanent

danger to the community in that they give rise to new infections. One of the most important problems, therefore, in the prevention of typhoid epidemics, must be the suppression of the spread of typhoid bacilli by such persons. As long as we are without the proper means of suppressing the continued existence of living typhoid bacilli within the human organism, our best efforts at preventing the spread of this fever can only be small. Until this problem shall have been solved, we shall have to content ourselves with purely hygienic measures, intended to reduce the dangers from the bacillus carriers to a minimum. The complete isolation of bacillus carriers would, of course, be the easiest way of attaining the desired result, but such an interference with the personal liberty of otherwise healthy persons has been found to be utterly impossible and impracticable. Hence there remains nothing but a tactful supervision and direction for the maintenance of cleanliness, especially before meals and after defecation. This general hygienic requirement must be emphasized, since it is more especially through soiled hands that the bacilli are transferred to objects and persons. Persons employed with the preparation of foodstuffs are especially dangerous. A very slight contamination of milk may lead to a widespread infection; the same is true of meats, vegetables, and fruits. The most scrupulous cleanliness of person seems at present the only prevention that can be relied upon. In order to give this assumption an experimental foundation the author has studied the influence of the washing of the hands, soiled with fecal matter, and devised a simple, sure, and effective method of cleansing the hands of bacillus carriers.

He soon found, that his experiment showed, while the simple washing of hands with soap and water resulted in diminishing the number of germs adhering to the hands, it was insufficient to remove them completely. Better results were obtained when the water in which the hands were washed, was renewed or when the washing was done in running water and the hands thoroughly dried with clean or sterile towels. In such cases the culture tests became negative in many cases, though not in all. While, therefore, it was shown that much can be done by a simple scrubbing of the hands, for removing microbes from the deeper layers of the skin, the additional employment of disinfecting agents seemed indicated.

Several disinfecting agents were tried, namely, carbolic tablets (diphenyloxalester); these were tried because found to kill typhoid bacilli after an exposure of one minute to a 0.5 per cent solution of the tablets in normal salt solution; the results were on the whole satisfactory; antiformin was found to be least satisfactory, and is therefore not recommended as a suitable means for hand disinfection; alcohol (60 per cent) was found to be most efficient, and is therefore highly recommended by the author as a valuable disinfectant for the

hands of bacillus carriers. It may be used in the form of eau de cologne and carried in small bottles or in the form of rags soaked with it and inclosed in well-covered tin boxes. With such rags the hands are thoroughly rubbed after having been scrubbed with soap and water and dried.

Summary.—1. As long as we are unable to prevent the continued parasitic existence of living typhoid bacilli in the human organism, personal cleanliness, especially that of the hands, must be insisted upon and special emphasis laid upon it.

2. The simple cleansing with soap and water in a basin, without subsequent drying, while effecting a diminished number of germs on the hands, is insufficient to free the hands completely from fecal bacteria.

3. The cleansing of the hands with water and soap in running water, followed by a complete and thorough drying, is often followed by a complete removal of fecal bacteria from infected hands, always, however, by a large diminution of the germs.

4. Upon the mechanical cleansing of hands with water and soap and thorough subsequent drying the principal stress must be laid.

5. Since the mechanical cleansing of the hands with water and soap does not, however, always constitute complete and absolute protection, especially in those employed in the preparation of food-stuffs, the subsequent employment of a disinfectant is recommended.

(a) For purposes of hand disinfection of bacillus carriers, neither antiformin, lysoform, nor hydrogen peroxide are recommended.

(b) The employment of carbolic tablets is regarded as satisfactory so long as the disinfection is done sufficiently long and with the necessary care.

(c) Alcohol, especially in the form of eau de cologne or the ordinary spirits used in lamps for burning, is specially effective in hand disinfection of bacillus carriers.

DIRECTIONS FOR BACILLUS CARRIERS.

1. Typhoid fever occurs in severe forms, affecting the nervous system, in less severe forms, affecting the mucous surfaces, or it may occur in such light forms that no signs of any disease are noticeable; it is caused by certain germs—the typhoid bacilli.

2. The typhoid fever patient carries the germs in his body and excretes them through his fecal matter and urine.

3. Certain persons keep on carrying the germs for months and even years after having had typhoid fever in their excrements and having become what is known as germ carriers; this condition may follow severe or light cases.

4. Bacillus carriers suffer, as a rule, from trouble in the gall passages, occasional colics, gall stones, or icterus; often, however, no symptoms whatever are present.

5. Bacillus carriers can, like typhoid fever patients, infect others with the disease. Infection occurs most frequently through the hands, slightly soiled at the closet, sometimes also through soiled linen.

6. The transfer of the germs from the hands of one person to another occurs either by direct contact or indirectly, by the uncleansed hands touching objects, foodstuffs, etc., to be used by the other person.

7. It is also possible that bacillus carriers infect themselves, in which case they cause an increase in the gravity of any existing trouble with their gall passages.

8. Bacillus carriers may avoid infecting other persons and their own person by observing the following directions:

(a) The bacillus carriers must at all times and under all circumstances aim at the greatest possible cleanliness.

(b) On rising in the morning, before every meal and before touching any food or drink (especially milk), a thorough cleansing of the hands is necessary.

(c) Bacillus carriers must, after using the closet, cleanse their hands with soap and water or with a suitable disinfectant. Paper must be always present in sufficient quantity in the closet.

(d) The bacillus carrier must have his own towel, to be used by himself alone.

(e) Dirty body and bed linen of bacillus carriers must be steeped for at least one hour in cresol water (2 tablespoonfuls of cresol soap solution to 1 liter of water) before being washed in the usual manner.

(f) Bacillus carriers should, if possible, abstain from employments as cooks and handlers of foodstuffs.

9. It is in the interest of bacillus carriers themselves to send their urine or stools to a bacteriological laboratory from time to time in order to find out whether they are still carriers or not. This examination, in Strassburg, is made free of expense; franked vessels are sent, at request, by the laboratory.

10. The laboratory is at all times ready to give information as regards disinfectants and their use by the bacillus carriers.

11. Bacillus carriers have a moral obligation to prevent the spread of typhoid fever by themselves through a conscientious adherence to the above rules that have been reduced and limited to those that are most necessary. (Bacteriological Institution for Lower Elsass, Strassburg.)—(H. G. B.)

BAEHR, JOSEPH. *Vorkommen und Bedeutung der Strepto-kokken in der Milch* (Occurrence and significance of streptococci in milk.) Arch. f. Hygiene, Bd. 72, Heft. 2, 1910, p. 91.

The occurrence of streptococci in milk and the interpretation of their presence there have been the occasion of serious discussion in recent years. While streptococci have, indeed, been found in many samples of milk by a number of reliable bacteriologists, none has perhaps attached to such findings the extreme importance that Petruschky has attached to it, and who holds that these streptococci constitute the essential cause of the summer mortality among infants.

It has been shown quite recently that the streptococci, so commonly met with in milk, are not of the pathogenic variety nor exactly identical with them; they resemble, on the other hand, much more closely those acid producers that are comprised in the genus *bact. lactis*, and which assumes the coccus form more frequently than it

does the bacillalar form, and Kruse has therefore proposed the name *Streptococcus lactis* to distinguish them from those of the pathogenic variety of streptococci.

Baehr, at the suggestion of Professor Schlossmann, subjected the point in dispute to a most thorough and searching experimental inquiry, and came to the conclusion that the pyogenic variety of streptococcus in milk was a rare occurrence. He found this coccus in only 2 out of 81 samples of milk, and 1 of these 2 samples came from a cow that had mastitis and the other had been obtained from a local milk dealer.

In 61 out of 81 samples (75 per cent) the presence of streptococci was demonstrable according to the method employed by Petruschky, but these streptococci were found to be identical with those described by Kruse as streptococci lactis, differing from streptococcus pyogenes by their morphological behavior, and especially by their inclination to give rise to involution forms when cultivated on solid media as well as on the souring of the milk. The cocci get into the milk through cow dung. It is considered that their presence is harmless. Milking of the cows in special stalls is recommended as a means of preventing their presence in milk.—(H. G. B.)

CROOKSHANK, F. G., M. D. *The control of scarlet fever.* Proc. Roy. Soc. Med., Epid. Section, January 28, 1910, p. 73.

The author believes that the removal of scarlet fever cases to isolation hospitals reduces the incidence of the disease in the community; he is, moreover, convinced that accidents and incidents of fever hospital segregation are as absolutely preventable as are the septic catastrophes which do not now occur in general hospitals.

The control of scarlet fever in a community means the control of seasonal prevalence, the limitation of occasional outbreaks, and the destruction of endemic and sporadic foci. It involves the organization of a public-health department and the adjustment of the general practitioner; an isolation hospital cooperating with the public-health department; the administration of the isolation hospital so that complete control is obtained over the diseases admitted thereto.

The author believes that epidemics of scarlet fever (except milk outbreaks) follow the intensification of a virus by passage through the bodies of susceptible persons, and that such epidemics terminate by reason of the attenuation of the virus after passage through a further series of cases. The normal cycle of an epidemic of scarlet fever does not extend beyond the sequence of six cases of which the earliest and latest are the mildest and least typical and infective

potency lessens with attenuation. The termination of outbreaks from attenuation of the virus is a far more reasonable explanation than is the alleged termination from exhaustion of the number of susceptible persons.

Through what phases the virus may pass, or in what media it may exist after it is lost sight of, is a matter for examination. It may perish; it may continue its generation in human beings with other or no clinical manifestations until intensification occurs in response to variations of the soil or other conditions; it may have an external existence; it may continue through other living hosts.

Crookshank associates sporadic fever cases most frequently with dusty houses.

The question he desires to raise is whether we may not, in small hospitals at any rate, safely treat all diseases side by side if we get a firm grasp on the real principles involved. The author has treated cases of diphtheria, typhoid, and erysipelas or puerperal fever in one ward and, on the admission of doubtful cases of scarlet fever or diphtheria into the wards, he has not transferred them when the diagnosis was found erroneous. The patients were simply isolated in his or her bed without partition or barrier. This, he claims, can be done, if proper technique is observed, as easily as it is done in a surgical ward of a general hospital every day.—(H. G. B.)

MCCOY, GEORGE W., U. S. Public Health and Marine-Hospital Service. **A note on squirrel fleas as plague carriers.** Public Health Reports, Vol. XXV, No. 15, April 15, 1910, p. 465.

A ground squirrel was inoculated with a culture of the plague bacillus derived from a case of plague in man (squirrel origin). Forty-eight hours after the inoculation 100 fleas (*Ceratophyllus acutus* Baker) were placed in the cage with the squirrel. This squirrel died on the fifth day, and at the autopsy showed the usual lesions of acute plague. Twenty-seven fleas were recovered from the body of the rodent. Two of the fleas were crushed and each showed in smears an abundance of pestlike bacilli. The remaining 25 fleas were placed in a clean cage with a healthy squirrel. This second squirrel died on the tenth day, presenting at autopsy the characteristic symptoms of subacute plague. A culture of *B. pestis* was isolated from the liver.—(H. G. B.)

SANDILANDS, I. E., M. D. **The communication of diarrhea from the sick to the healthy.** Proc. Roy. Soc. Med., Vol. III, No. 5, p. 95, March, 1910.

The author undertakes to analyze critically the now generally accepted doctrine that diarrhea is an infectious disease, capable of spreading from the sick to the healthy, and he uses as a basis for

argument the deaths from diarrhea that occurred in Kensington during the third and fourth quarters of the year 1909. He proceeds to test the infectious nature of the disease by five indications, namely, (1) epidemicity, (2) multiple invasion of houses or families, (3) consecutive dates of onset in multiple cases, (4) incidence in crowded areas or dwellings, and (5) incidence on those in contact with the sick in hospitals. In his conclusions, derived from case histories, he states that they might be interpreted as suggesting that diarrhea is a communicable disease. After, moreover, investigating the influence produced by the water-carriage system of sewerage on disease incidence, and which is exhibited in the form of a number of charts, he concludes that it may be said that the prevalence of two intestinal diseases has declined in a very remarkable manner in two towns, where the practice of exposing human excrement in pails and middens has recently been abolished, and further that both diseases are due to bacteria, which are known in the one case and assumed in the other to reside in the fecal excrement of infected persons. In his general conclusions our author wisely remarks that while—

Abstract considerations can with the aid of the house fly be made to fit the theory that every case of summer diarrhea is derived from the fecal excrement of a previous case, practical experience of single attacks, in persons far removed from other patients and of groups * * * separated from one another by considerable distances of space and time, suggests that the manifestations of diarrhea observed in water-closet towns neither disprove the existence of impersonal sources of infection in many fatal cases nor demand the rule of universal human origin, which they can be forced to support.

[Our author in trying to be fair appears, on the other hand, slightly hypercritical when he says that the hypothesis of house-to-house infection by means of flies is attractive, but could hardly be expected to explain in the absence of valid evidence the spread of diarrhea from family to family in the same house, and more especially from person to person in the same family. The reviewer in this respect agrees with Doctor Niven, who remarks, in the discussion of this paper, "If that took place outside the family, it might equally occur within it." It would seem not very far-fetched to infer that flies that can carry infectious material from house to house would likewise be able to carry the same infection from person to person and family to family within the same house.]—(H. G. B.)

NIVEN, JAMES, DR., Pres. Epidem. Sec., Roy. Soc. Med. **Summer diarrhea and enteric fever.** Proc. Roy. Soc. Med., Vol. III, No. 6, p. 131, April, 1910.

The author characterizes summer or epidemic diarrhea as an affection marked by a somewhat definite group of symptoms, in which

the vomiting sickness, copious diarrhea, rice-watery and green stools, and finally convulsions play a conspicuous part. The condition is often attended by fever and shades into typhoid and paratyphoid fevers, and, not rarely, terminates a tuberculous enteritis.

Diarrheal mortality is excessively high in the districts of Manchester, in which the privy midden has prevailed, as in Bradford, Clayton, Openshaw, and West Gorton. The effect of wretched home conditions is demonstrated by the persistence of a steady high mortality. The figures show that in some one week of the year the number of cases makes a sudden leap upward. These conditions are such as would be likely to produce a great increase in flies.

It was felt that this phenomenon was the key to the explanation of the autumnal rise of enteric fever.

If the house fly is the transmitting agent in summer diarrhea, the author holds that the following conditions should be fulfilled :

1. (a) There should be evidence that the house fly carries bacteria under the ordinary summer conditions.

(b) That house flies should be present in sufficient numbers in houses invaded by fatal diarrhea.

2. That there should be a close correspondence between the aggregate number of house flies in houses and the aggregate number of deaths from diarrhea week by week.

3. The life history of the house fly should explain any discrepancy between the observed number of flies and the observed number of deaths.

4. The minority of breast-fed children apparently not accessible to infection should receive explanation.

5. There should be a closer correspondence of diarrheal fatalities with the number of flies than with any other seasonable facts.

6. Any other closely corresponding seasonable fact should be capable of interpretation in terms of the number of house flies.

7. Any variation from district to district in the annual curve of deaths should be accompanied by a similar variation in the curve of flies.

8. * * * If it can be shown, moreover, that that portion of the enteric wave which is connected with flies changes from one period of time to another in such a manner as to be explainable in terms of flies, and not of meteorological conditions, the evidence in favor of flies will be greatly strengthened.

9. No other available hypothesis must be capable of explaining the cause of summer diarrhea.

After a most careful and painstaking research, and based upon the vast amount of statistical material exhibited in the form of tables and curves, in which the other shows the influence upon mortality of meteorological conditions as well as that of the number of flies, the author is forced to the conclusion that flies constitute the principal factor in the transmission and spread of summer diarrhea, and that "no other explanation, even approximately, fits the case."

Similar, if not identical, conclusions are reached with regard to enteric fever.—(H. G. B.)

MERCIÉ, MÉDECIN D'ESCADRE. *Rapport d'Inspection Générale de L'Escadre du Nord.* (Report of a general inspection in the northern squadron.) Archives de Médecine Navale, January, 1910.

The writer states that in his preceding report (1908) he discussed at fitting length all questions affecting the hygiene of crews and ships, as well as the organization for the care of the wounded in peace and war, and that if one wishes to know the existing state of affairs on the ships of this squadron and his opinion and recommendations thereon it will be necessary to refer to that report.

The present report deals therefore only with the changes effected in the various ships since the last general inspection, and formulates anew desiderata previously laid down. The two reports form, therefore, a complete exposition of all that is of interest from the point of view of hygiene and medicine that occurred to the writer during his two years' cruise. (I have not been able to find a copy of the 1908 report. F. L. P.)

Chapter 1 deals with the "hygiene of ships," and in it Mercié states that only a few of the improvements whose utility he had labored to demonstrate were realized during the stay of the ships in port, the most important remaining in abeyance, and he insists anew on the necessity of an improved ventilation of the between-deck compartments situated on both sides of the long fore and aft passageway, which, thanks to the hatchways installed, are now in much better condition. Among the compartments requiring ventilation the writer points out particularly the machinists' and firemen's wash rooms, where the heat is extreme and a disgusting odor persists. He admits that the solution of the difficulty is not easy to find, especially in ships already constructed, but asserts that in future ships a vigorous movement of air in these compartments should be provided.

He had already invited attention to the fact that the ventilation in officers' wardrooms is often defective, and had proposed a remedy by a special disposition, for example on the *Marseillaise*, on which ship the upper portion of the ports is open and communicates with the corresponding between-deck spaces. He remarks, however, that it is only fair to recognize that oftentimes the ventilation is bad through fault on the part of the occupants themselves.

Who, he asks, in the navy, does not from experience know of those wardrooms, where ports and skylights are never opened for fear of drafts, polluted by the musty odor of tobacco smoke, of food, and human emanations, and filled with a smoke so dense that at 10 o'clock in the evening one can scarcely see?

Reason should dictate that all ports that permit of opening be left open a sufficient time daily; but protests are generally encountered, and the commanding officer is disinclined, and justly, to interfere in a matter that touches the intimate life of the officers; so much the worse for them if they do not know how to conform to the most elementary requirements of hygiene.

Mercié feels that the men who work below the protective deck should also show more willingness to leave compartments, where the aeration, however active, can never achieve perfection, and go more frequently in the open air on upper decks when circumstances permit.

At the present time one knows how difficult it is to make these men leave their places below, where it has become their habit to stay, and it is only under compulsion—as, for example, when they are assembled for exercise—that one sees the fireroom force, and however little one goes to sea, one notices how ingenious they are in evading this summons.

The writer states that he has but little to add to what he had already said the previous year with regard to natural or artificial heat on board ship, the care of compartments, or the drainage of ships, adding that only the latter subject will be spoken of at length.

In conformity with a recent order, several ships of the squadron have installed in the heads an apparatus for electrolyzing the flushing water, which has worked satisfactorily, and there has been an evident advantage in its use by comparison with the mechanical carrying away of material by running water, assisted intermittently by powerful flushing. Ordinary common sense shows that the immediate or almost immediate removal of this material radically suppresses bad odors better than any other means, however powerful, but it does not follow that the employment of disinfectants should be condemned, particularly electrolysis; on the contrary, the more numerous the means at our disposal, the more readily we shall achieve our object. It is only a question of practical usage, whether the commanding officer, relying upon the advice of his medical officer, will limit himself, according to circumstances, to a single means which works satisfactorily, or use in addition an adjuvant which may be electrolysis or some other disinfectant.

The writer goes on to say that almost all the ships of the squadron leave something to be desired in the matter of spit kids or spittoons, and that only one of the ships, the *Gueydon*, has installed the bracket spittoons of enameled iron; the type seen elsewhere appears insufficiently strong, for after a few months of use the enamel has already scaled off, especially at the edges. The writer remarks that this question of spittoons is one difficult to settle; it is evident that the spit kid should not, as in former times, be placed on deck, and, owing to the motion of the ship, it can not well be placed on a stand or tripod; it appears indispensable, therefore, to have it fastened to a bulkhead or side wall, but in this latter position it is exposed to repeated injury. In the writer's opinion, there are grounds for preferring an oval shape instead of the circular one now in use (which projects too far), and, in addition, the place selected for its attachment on the bulkhead or wall should be the least exposed, a reentering angle or recess, for example. Another cruiser also has the enam-

eled-iron spittoon, but, what is most regrettable, they are not used. As a result, there are 5 large ships out of 6 reduced to a small number of wooden spittoons and to a few metallic ones in wardrooms, these being simply placed on deck, a procedure, which, to say the least, is inconvenient. The *Marseillaise* requested the replacement of her wooden spittoons by metal ones, but the navy-yard at Brest replied that the latter would be supplied after the ones now in use had been worn out; the writer remarks that as their wear and tear amounts to little, nothing remains but to hope for them by the twenty-first century, if by chance that century has more liberal ideas than the present one.

Doctor. Mercié states that he does not wish to repeat his previous criticisms relative to certain quarters, their dispositions, arrangements, etc., but that these criticisms still apply, although he recognizes that the improvements so requested referred mainly to the future.

In terminating these brief considerations on hygiene, the writer takes occasion to repeat once more—

That the progress realized in this direction on modern ships is considerable, and, as Doctor Cras has justly remarked in his report on the *Leon Gambetta*, there are often only a few efforts to make, a few slight modifications to achieve, in order to attain a quasi-perfection. Nevertheless, we can not delude ourselves with chimeras; one must apply to the general hygiene of the naval vessel the judicious conclusions of the report of the last commission of inquiry on defense by the navy in war; just as this defense will never be perfect in spite of all progress, present and future, so also will hygienic perfection never obtain, from the fact that it is war for which men-of-war are constructed, and between the exigencies of war and those of hygiene, the antinomy is irreducible: one may succeed in rendering war less terrible (and that is what we all strive for), but one can not do away with it altogether.

Chapter 2.—The author states that he will not repeat what he previously said the past year upon the instability of crews, not less unfortunate from the medical than from the military point of view, nor what he said upon the health record (*livret sanitaire*)^a demanded for so long a time by navy surgeons, and justly so, nor of body cleansing, which is still limited to washing from buckets, in spite of the notorious disadvantages of this system. But the writer insists anew upon the manifest improvement that would follow upon the substitution of drawers (*tiroirs*) for the present inconvenient clothing bags, and upon the usefulness that would result from the authorization or even encouragement of the employment of sandals on board ship, an experience with them for several years on the *Dupetit-Thouars*, thanks to the praiseworthy initiative of the commanding officer of the *Gueydon*, has given and continues to give excellent results.

^a The health record has been rendered a matter of regulation in the French navy.

Bedding.—Sometime ago, the *Gueydon* entered upon a trial of a sheet sac, composed of a piece of seamless linen, folded upon itself lengthwise, the free borders of which, once the man is turned in, are reunited over him by means of stops (*liettes*). The use of this mode of bed covering encounters the tenacious resistance of those interested and a resistance which (the writer regrets) is not unreasonable; the sheets soil quickly, very quickly, especially when used by the fireroom force, and the interval of fifteen days before washing is manifestly too long, and besides, washing necessitates time, trouble, and much soap. In fact, the greater number of men to whom these sheets were issued used them simply as pillows. Nevertheless there is reason for continuing the trial of these articles, and perhaps in the long run, this improvement may be accepted, even if one should be obliged to leave the use of the sheet sac optional. The provisions of the ministerial decree of May 15, 1909, relative to the disinfection of bedding, are strictly carried out. The writer states also that he is happy to note that on all the cruisers the disinfectors have been much more employed than in the past, and that the disinfection of the sick-bay bedding has become a matter of routine.

Food supply.—The navy has realized in this respect a real progress, and one may say in general that the ration is satisfactory. It has not given cause for complaint since the last general inspection, except on one occasion. In one cruiser the meat, delivered a little late, was recognized as being bad and was thrown overboard; another time, on the *Marsellaise*, the crew refused to eat the beef, which, according to all evidence, was sound. In fact it is necessary on shipboard to take into consideration possible impulses resulting from prejudice, against which it is very difficult to bring about a reaction; the psychology of crowds explains these occurrences, which are elsewhere quite rare. The reports of the senior medical officers indicate a current of opinion very favorable to rationing by the Government, because it is given under a guaranty; one might only wish that the list of provisions was a little more generous. The messing system suits quite perfectly and especially on the smaller units, such as torpedo-boat destroyers; but on the larger ships the advantages are more contestible, especially when the former are given the privilege of drawing from the open markets. It appears, indeed, that the moment one does not benefit from the fluctuations from the daily prices, it is more logical to make the rationing the service of the Government. In any event the commutation value of the rations is unanimously declared to be insufficient; the cost of living has risen for seamen as it has for the rest of the population; one might say that for seamen it has become more costly and there are certain localities where the increase of prices, upon the arrival of the squadron, takes the proportions of genuine extortion.

Here follows quite naturally an observation which has a peculiar importance. In many places, in the "Instruction of 1902," in regard to objects which have nothing to do with food supply, but which, nevertheless, contribute to the health of the crew, one encounters the stereotyped phrase, "To be paid for out of the surplus-ration allowance." Now, the budget of the ration, receipts of which are decreasing, and which is involved in all sorts of accessory expenses, can with difficulty meet its normal obligations, being further handicapped by the dearness of food supplies. It is time for the administration of the navy department to frankly recognize the state of affairs and not charge the surplus, which frequently exists in the skeleton state, with improvements that can not be carried out, and which remain in a state of false promises. For example, it is no longer admissible that the already insufficient mess fund should be charged with the cost of the formalin generators for disinfecting barbers' utensils.

If the quality of the food is generally good, one must admit that the diet lists are wanting in variety. There are several reasons for this: Insufficiency of provisions in certain localities frequented by the squadron; insufficiency also of purchasing money for supplies, which restricts the choice of foodstuffs; insufficient number of ovens compared with the number of messes; and finally, insufficient personnel. This last point merits a moment's attention and the remedy would be easy to find. Ordinarily a baker cook is enlisted and given charge of the kitchen and the oven; now, it is possible to be a good baker and a very bad cook, and vice versa. The senior surgeons demand, therefore, that a professional cook shall be enlisted for the crew, who will only cook, and on the other hand a baker for the oven. The commissariat is directed either by the second officer or on some ships by the commissary, or, in the southern squadron, by the senior surgeon. One can say that in the north, the officers try their best to give the men satisfaction; but the unfavorable conditions which I have enumerated above hamper them greatly. And then everyone has not the special aptitude; it appears for example that the alimentation is best on the *Amiral Aube*. The senior surgeons superintend the menus with great care and this collaboration can not fail to produce good results in the long run. The bread is good ordinarily; it would be better if they had good ovens. The Somesco oven according to general opinion is least to be recommended. Mechanical bread kneaders, especially the Havet-Dellatre, are used most frequently. The bakers who prefer kneading by hand are rare nowadays. In closing these remarks on rationing, which are only a continuation of those I wrote last year, I demand instantly that the vessels of the squadron be provided with provision storerooms. The *Dupetit-Thouars* alone has a proper one; that on the *Marseillaise* is badly situated, too small and open at the bottom and above; the other cruisers have nothing and the meat on board remains exposed to all dirt in the places where there is most traffic. It is time to accomplish a progress which will not cost much either in trouble or expense.

Water.—On several of the vessels the water tanks are not sufficiently easy of access and not sufficiently removed from causes of contamination. The greater number have been cemented, but this operation does not seem to have always been done with the necessary care, because on the *Amiral Aube*, on inspecting the tanks, after fifteen months, the cement was found to have fallen from all the walls and was mixed in the bottom with a rusty ooze. In this particular case another process (Bessemer) was substituted for the cement, but it will require a later visit to know the results, especially with regard to its adhesive qualities. It should be understood that only distilled water is drunk on board all the ships. A recent ministerial decision settled the question of filtration of water as a result of experiments continued for several years on a certain number of vessels, and which have demonstrated that filtration added nothing to the quality of the water and in some circumstances facilitated its contamination. It is optional with the commanding officers to cease using the filters of the distilling apparatus and even to land them. But hardly had this apparently been definitely settled, when the question of filters is again raised by incidents which happened on two cruisers of the squadron. The *Marseillaise*, having been sent on a mission to St. Nazaire, where she anchored in shallow water, reported the penetration of mud to the distillers, which fouled the animal charcoal clarifiers in the average proportion of one kilogram of mud to every ton of distilled water. Furthermore, the *Gueydon*, during a prolonged stay at the anchorage at Verdun in the Gironde, had her filters fouled by the sand in the river water. There appear to be, therefore, circumstances where the filters may be necessary and this fact would be an argument against landing them. On ordinary service they would be disconnected, but on the rare occa-

sions, when vessels remain in the estuaries of large rivers, in shallow water, there would be an advantage in employing them during their entire stay.

The senior surgeon on the *Gueydon* has had the excellent idea of furnishing each scuttle butt with a prominent sign recommending the men to wash the drinking cup before using. These are recommendations which can not too frequently be multiplied, and I have called the attention of the other senior surgeons to this one in order that they might profit by it. The issue of tea and the L U biscuits, which I pointed out with pleasure and praise last year, and in which the *Amiral Aube* took the initiative, continues most successfully. One can not but applaud this result and regret that so good an example has not been followed by the other vessels of the squadron.

With regard to the target practices, the only remarks to be made concern the *bonnets parasonffles*.^a Those which were issued on the *Leon-Gambetta* were nearly all too small and did not fit all heads. By slitting them up the middle and lacing the two halves a perfect adaption was obtained and they gave excellent results in protecting the ears. There would be an advantage in making the precaution of wearing these bonnets a general one, but the hygienist would be pleased to see that a bonnet is used exclusively by the same gunner during the entire length of his stay on board; at the end of his enlistment, it should be passed through the disinfecter before being issued to his successor. We have fortunately not observed during the course of the year any new accidents of intoxication from powder gases during target practice.

Chapter 3, dealing with certain hygienic features of wireless telegraphy stations, will be left for a subsequent number.

Chapter 4.—The Medical Department.

(A) IN PEACE TIME.

Compartments and equipment.—The writer states that it might well be surmised that since the last general inspection, none of the sick-bay compartments on any of the cruisers have undergone any important modifications and that he will be concerned in making a few short remarks on this subject, as follows:

In the fitting out of a sick bay on a modern man-of-war there is a minimum of favorable consideration that it is inconceivable is not universally recognized. One experiences a sentiment of discomfort, I was about to say shame, especially before visiting surgeons (and with greater reason when they are strangers) in mentioning the absence of equipment which is everywhere recognized as indispensable. Who could imagine that in the year 1909, in the *Amiral Aube*, one has been reduced to use as a washstand a very small copper basin, which dates back perhaps to the time of Colbert? It is time, and more than time, to give to the larger ships equipment in harmony with progress in surgery. I demand then most firmly the absolute suppression of wooden dressing and operating tables, and other obsolete material, and that they be replaced by metal ones. I ask for each ship a washstand with pedal attachments, a suitable sterilizer, in brief, all that is required to carry out properly and decently the daily surgery, and when necessary, for graver interventions, the necessity for which may happen at any time. The greater number of the medical officers ask for a number of improvements, of which I will endeavor to recall the most important:

^a Literally, caps for warding off blows (i. e., concussions from gunfire).

1. A larger number of clinical thermometers, on account of breakage and the number of sick, which on a ship with its maximum complement may become considerable; the substitution of irrigators (*bockslaveurs*), with rubber tubing and glass cannulas, in place of the more costly irrigators, which get out of order so easily.

2. The improvement of the dental implements contained in the surgical case.

3. The substitution of the dentifrice powder by a dentifrice soap, equally efficacious and more economical. The substitution of plaster of Paris in glass or metal containers for the silicate of potash that no one uses any more.^a

4. The issue of ampoules for hypodermic injections and of compressed tablets for delicate dosage with active solutions.

5. The issue of peroxide of hydrogen,^b of bisulphite of soda (for decolorizing after the surgical use of permanganate of potash), and of other medicines mentioned in the reports of medical officers.

* * * * *

Service.—The sanitary inspections are regularly and properly carried out. We are past the time when every Thursday the surgeon half glanced over the hundreds of hands which were extended for his inspection and then withdrawn in an automatic manner, and also by the time when one only sought to pick out the cutaneous and venereal affections. To-day this inspection is, for careful officers, a means of arriving at an estimate of the general state of health on board and the progress made or the reverse; it is an opportunity also of giving useful advice, more attentively listened to because individual. Many surgeons are annoyed, and justly so, that the petty officers are excused from this exercise; very often they are the first to lose by it and, as the inspection is strictly individual, one can not see how an obligation to submit to it should appear repugnant.

On all the ships I have found the official registers (medical journals) well kept. Very often they are completed from the rough journals, the employment of which should be encouraged, particularly for writing the results of the examinations of men received on board. In the absence of an individual health record, which it would be well to accord to us, it (the journal) is an important source of information, which permits the medical officer to follow up with the interest that it merits the malingeringers, the constitutionally sick, accidents, etc.

Personnel.—The request of the junior medical officers, that I formulated insistently over two years ago, has received satisfaction, thanks to the recent reorganization of the naval medical corps. Its application is made only too slowly in the northern squadron, owing to there being available no wardroom staterooms on most of the ships, and owing to the indifference of commanding officers. At present the *Gueydon* alone remains with a single medical officer, but this ship has authority during her next stay in port to construct a room for the accommodation of a medical officer of the second class. Thanks to the reinforcement of the medical corps, it is now possible to assure a more regular medical service for the torpedo-boat destroyers; but this service will scarcely function properly until each flotilla shall have its own surgeon embarked upon one of its number, as I have requested in a special note, forwarded with the favorable indorsement of the commander in chief and repeated in my last report of general inspection, to which I can only refer. All the senior surgeons request an increase in the number of hospital attendants on board. At the present time each ship has a first or second chief nurse alternating with a

^a Now regularly issued.

^b This has now been adopted.

hospital steward. The medical officers would prefer an additional nurse, or at least a seaman rated as nurse. The reasons they give to justify the augmentation of personnel do not seem as convincing as they did a year ago. Under ordinary conditions the number of sick on board is not so high that two nurses do not suffice to care for all; hospital nurses have, by comparison, a much harder service. It is true that those on board ship have to keep in proper condition a large number of compartments, the care of which is irksome. From this point of view they require assistance, but it is not necessary or even desirable to employ a nurse exclusively in maintaining cleanliness. Ordinarily the commanding officer will assign an extra duty man for this work, and experience has demonstrated that this works well when the chief nurse occupies himself zealously with the care of the compartments over which he has charge. When necessary this situation should be adjusted, but that is all. Formerly, it should be noted, in a squadron which possessed (as is actually the case) a large number of torpedo-boat destroyers it will happen from time to time that a nurse attached to them falls sick, goes on leave or to hospital. This has happened many times and has proved embarrassing, for one can not leave a ship without a nurse, and, on the other hand, there is no doubt that in taking from one of the larger ships its chief nurse to replace the other the service on the cruiser will suffer. Besides, we must not forget that the first or second nurse who remains alone finds himself condemned to a prolonged retention on board, contrary to the good principles which for the other categories of the crew regulate liberty. To obviate this inconvenience I estimate that it will be necessary to place an additional chief nurse on each flagship for the special purpose of filling vacancies when they arise.

(b) IN TIME OF WAR.

Under this head the organization of the medical department for battle left much to be desired in the last general inspection, and I then stated that, with the exception of the *Leon-Gambetta*, the other ships possessed absolutely nothing acceptable for the transport and care of the wounded. Progress in this direction is made but slowly in the navy, and at the time of the present inspection the situation is really not much better; but if a good organization does not exist it is in sight, and it is to be hoped that my successor, more fortunate than myself, will enter the promised land, which I am permitted to see only at a distance. Since the organization is not uniformly settled upon, this is the one which represents the point of view which I am occupied with in the squadron. The *Leon-Gambetta* has an excellent principal dressing station for wounded sufficiently large, airy, and well arranged, situated on the protective deck aft. Her station for the wounded forward, having been deprived of about all of its free space in order to install the new wireless-telegraphy cabin, can no longer serve for anything but minor dressings; the senior surgeon proposes to utilize the adjoining wash rooms, but their temperature and inadequate ventilation scarcely qualifies them to serve for dressing stations, and especially not for operations. Transfers of the wounded up to now were made by elevators, an inconvenient and even dangerous system, which would no longer work if the shaft walls were injured even slightly by shell. The elevators have been replaced by the Auffret stretchers, which are transported partly by hand and partly by suspension, without interfering with the ladders. The system is ingenious but slower than the vertical descent, the ladders being removed. On the *Marseillaise*, the *Gloire*, and the *Amiral Aube*, the old stations for the air-charged torpedoes are going to make superb stations for the wounded. On the first of these cruisers this arrangement is being carried out and will be finished in a few weeks. On

the *Amiral Aube* it will be necessary to wait a little, but there is no doubt that this cruiser will carry out the same plan in her turn. The secondary stations, unchanged, are aft in front of the sail room. The *Marseillaise* is the only vessel in the squadron where a speaking tube establishes a communication between the central station and the surgeon, who thus, even during action, can be acquainted with all that concerns his duty. I have remarked elsewhere how important, in my opinion, is this arrangement, which, after an engagement, will greatly facilitate the location of the wounded. The *Gueydon* is making praiseworthy efforts to improve its organization for battle, which last year left a great deal to be desired. The stations, insufficient as to space and ventilation, are at least correctly placed and in a condition to be used at a moment's notice. Transport is made from forward, by means of the Auffret stretcher, by direct vertical descent; from aft, by a sort of stretcher lift, regulated by guiding lines. It is regrettable that they should have taken so much pains to install this defective system, which would undoubtedly not work after a battle; here (i. e., aft) as in the case forward, the Auffret stretcher is used. As for the *Dupetit-Thouars*, the location and fitting out of the dressing stations is only projected; the scheme is sensible, but awaits ministerial authorization; then, authority obtained, it is necessary to execute it. All this will take time, I fear. The transport of wounded on this ship is difficult; in brief, all of this organization is in an embryonic state, and the situation is identical or little better than that which I had to regretfully report two years ago.

On all the cruisers one has naturally been led to choose as first aid or relief stations the area comprised between the casemates and the thwartship armored bulkheads. There is here sufficient protection to safeguard the morale of those wounded, who, during action will not be able to go to the main dressing stations. Outside the flagships, where musicians form the greater part of the stretcher bearers, this personnel ordinarily leaves much to be desired. Many commanding officers continue, in spite of ministerial decision of 1906, to compose it partly of cooks, stewards, and other ratings, that the senior surgeon very rarely can have at his disposition; furthermore, the instruction is brief, as one might expect it to be under those conditions.

A little time after I entered upon my duties as fleet surgeon I proposed and the commander in chief ordered that practical conferences on first aid to the wounded and the asphyxiated be given by the senior surgeon to the chief petty officers, who, in turn would communicate the knowledge thus derived to the men under them. This is not the place to review the considerations which led me to propose this measure; I have given them at length in a special report which has figured in squadron orders, and I still believe that real progress lies in this direction. I can only hope that this matter will be continued, and thus verify by practice whether my ideas are well founded. At the present time I have to regret that nothing much has come of it, for several reasons: First, the frequent changes in medical officers, from transfers and promotions. I have seen, for example, five senior surgeons succeed one another in the *Leon-Gambetta*. Secondly, the frequent stays of ships in dock or at yards, prolonged sometimes more than six months (as, for instance, the *Gueydon* at Cherbourg). Under such circumstances it is evidently difficult to arrange for the personnel to come to the conferences in a regular manner. Aside from these difficulties, it must be recognized that I encountered an almost invincible inertia, quite as much on the part of the commanding officers, who, doubtlessly considered that these petty officers lost their time at the conferences and could have been better employed, as on the part of the medical officers.

I confess that the nonsuccess of a measure in which I had placed great hope has caused me lively regret, not from a narrow self-conceit on the part of its

creator, but because it moved, I still believe, in the direction of progress, which may have the best results, not only in military service but also in civil life. The fact that the personnel for instruction was in the main animated by extreme willingness, and thoroughly understood the usefulness not only to the service but for themselves of the facts that I desired to convey to them makes the regret the keener. On several occasions when I have assembled them and have made practical demonstrations I have always noticed by their attention and attitude that they listened with interest and that they not only understood, but endeavored to remember my explanations and advice. I do not know what ideas my successor may have on this subject, but if he follows the same path I sincerely hope that he will achieve better results.—(F. L. P.)

SURGERY.

Surg. **RAYMOND SPEAR** and Passed Asst. Surg. **H. W. SMITH**, U. S. Navy.

RANSOHOFF. Terminal arterial anesthesia. *Annals of Surgery*, April, 1910, p. 453.

The anesthesia is induced by the injection of a cocain solution directly into the artery supplying the area to be anesthetized. It is applicable only to a certain group of cases in limited areas of the body.

The nature of the anesthesia is terminal—that is, the cocain is carried by the capillaries to the individual nerve endings. The solution is diffused through the capillary walls into the surrounding tissues, and very little, if any, is returned through the veins to the general circulation. This is shown by the purely local character of the anesthesia.

The following technic is to be used in man: The main artery supplying the part to be anesthetized is exposed under infiltration anesthesia. An Esmarch strap is now bound about the limb some distance above the point of proposed injection into the artery. The Esmarch should be used as in the Bier hyperæmic treatment—that is, snug enough to constrict the veins, but not so tight as to interfere with the arterial circulation. From 4 to 8 c. c. of 0.5 per cent cocain in normal salt solution should be injected into the artery in the direction of the blood stream. The needle used should be as fine as possible. After anesthesia is complete, the Esmarch may be tightened, if perfect hæmostasis is desired. At the end of the operation the Esmarch is removed and the wound closed. The maximum dose suggested—that is, 8 c. c. of 0.5 per cent cocain solution—contains only 0.04 of cocain, a safe dose. This method of anesthesia is an ideal one for certain areas of the body where general anesthesia is contraindicated. It is particularly applicable to the upper extremity, where the brachial, radial, or ulnar artery may be exposed with little difficulty. For the larger operation on the lower extremity, where general anesthesia is contraindicated, spinal anesthesia seems more desirable, but for the operations about the foot and ankle this anesthesia has a distinct place. The greatest advantage of this procedure is its safety, which depends on the small quantity of dilute cocain solution used and its probable diffusion into the tissues.—(H. W. S.)

BARNEY. Varicocele: An analysis of 403 cases. Bost. Med. and Surg. Journal, March 17, 1910, p. 350.

Varicocele is a disease which has occupied the attention of medical writers from Celsus himself down to those of the present day. After all these years its etiology is still unsettled and its treatment far from ideal. Any light which can be thrown on the disease and its cure should therefore be welcomed, even though the literature fairly bristles with articles with this title.

The following figures are based on an analysis of 403 cases taken from the records of the Massachusetts General Hospital:

End results.—An investigation of the ultimate results of any operation is of much value. Do we cure our cases? Do they stay cured? These are the questions which every surgeon should ask and answer. This applies to varicocele quite as much as to other lesions, but I feel that the disease and the operation for its cure are too lightly considered. Its simplicity and frequency make us overlook the fact that it is not always successful.

These operations were the same in every case. An incision (high or low, usually low), isolation of the mass of dilated veins, ligation above and below, excision of the mass between ligatures, approximation of the stumps by suture, and closure of the wound (generally without drainage). The vas deferens and spermatic artery were carefully avoided in every case, so far as I know. These results were obtained all the way from one to ten years after operation.

Of 39 cases from which satisfactory replies were obtained, 36 per cent still complained of pain in the testicle or groin. In other words, the symptom for which the majority had sought relief had not been cured.

Thirty-one per cent complained of tenderness in the testicle. It is hard to say how much of this was exaggeration of normal testicular sensation and how much was due to operation. At any rate, it was a source of annoyance and discomfort, whether natural or acquired.

In 27 per cent sexual hypochondriasis was still present. This varied all the way from a dulling of sexual impulse to actual impotency, and seemed to be independent of the often coexisting excellent anatomical result.

So far as I know, and this is really more important than anything, no further atrophy of the testicle occurred. Istomin, also Corner and Nitsch, regard a fibrous degeneration of the testis after operation as the most frequent untoward result. Some writers, they say, have found it in 90 per cent of cases. All I can say is that it is uncommon in this vicinity, to say the least.

Recurrence was found in 6 cases (15 per cent), which is better than the 20 per cent of the statistics of Corner and Nitsch. As stated above, 8 cases came to the hospital with recurrence from operation performed elsewhere. So far as the records state, none of the recurrent cases were recurrent a second time, and none of the cases traced by me had been operated on before.

However, 80 per cent of these cases acknowledged that the operation had been a distinct benefit to them. This meant entire relief of all symptoms in some cases. In others the operation bestowed blessings which ran all the way from an ability to discard a suspensory up to the manufacture of a new man, mental or physical.

The lessons of this analysis are, therefore—

1. We must discard the old ideas of the mechanical origin of varicocele and lay greater stress on its being a congenital defect of overgrowth.

2. The so-called radical operation is by no means universally successful and in most cases can be advantageously supplemented by a course of psychic sprouts such as most physicians use in their daily routine.—(H. W. S.)

- MELTZER.** The method of respiration by intratracheal insufflation, its scientific principle and its practical availability in medicine and surgery. *Medical Record*, N. Y., March 19, 1910, p. 477; April 2, 1910, p. 586.
- MEYER.** Avoidance of apparatus complicating operation in thoracic surgery. *Med. Rec.*, March 19, 1910, p. 483.
- CARREL.** Experimental intrathoracic surgery by the Meltzer and Auer method of intratracheal insufflation. *Med. Rec.*, March 19, 1910, p. 491.
- ELSBERG.** The value of continuous intratracheal insufflation of air (Meltzer) in thoracic surgery. *Med. Rec.*, March 19, 1910, p. 493.

Meltzer describes a new method of effecting lung ventilation by the continuous movement of a current of air in one direction. A tube, distinctly smaller than the lumen of the trachea, is introduced as far as the bifurcation. A stream of air is maintained through this tube and returned by way of the space between the tube and the tracheal walls. The pressure by which the air is driven need not be more than 10 to 12 millimeters of mercury.

The distinguishing points of this method are: The insufflation is continuous. It is done under higher pressure. The respiration is sustained simply by air. The current passes out by the same normal opening by which it enters, the canal being divided into two paths by an artificial partition. Finally, the pressure within the trachea remains, throughout the insufflation, higher than in the pharynx, and there is therefore a continuous stream of air moving in the direction from the trachea toward the pharynx.

If the tube seems not to furnish sufficient air, the supply may be interrupted once or twice per minute. The resulting temporary contraction of the lung favors the exchange of gases so that a cyanotic lung immediately becomes pink. The tube may be introduced through the larynx. In no case did the pulmonary organs show any after effects from the method. The trachea seems immune against the invasion of substances from the pharynx, probably because of the protective action of the outward current of air. Animals become easily and quickly anesthetized, overnarcotization appears to be impossible and recovery from the anesthetic is prompt. Since no respiratory movements are essential, the method supplants artificial respiration. The air is furnished by a laboratory pump and is filtered by cloth screens.

Meyer occupies his article chiefly with objections to the principle of the Meltzer method and the apparatus used. Meltzer, in his reply, answers Meyer's objections and urges that Meyer has had no experience with the apparatus, whereas he, Auer, Carrel, and Elsberg have used the method, and used it successfully.

Alexis Carrel, during experiments on the surgery of the heart and aorta, has used the Meltzer method. He states that:

No complication followed the use of the Meltzer and Auer method. Very extensive operations were rendered possible by the employment of their appa-

ratus. It is certain that the method of Meltzer and Auer, by its simplicity and efficiency, is a great advance in the experimental surgery of the thoracic organs.

Elsberg believes that:

With proper precautions, the introduction and presence of a rubber tube in the trachea is free from danger. (2) The introduction of air under the degree of pressure used is not productive of harm. (3) The resulting distention of the lungs is not harmful.

Elsberg also used the method on a human being with successful demonstration of its usefulness.—(H. W. S.)

GERSTER, A. G. The treatment of diffuse progressive free peritonitis. *Annals of Surgery*, April, 1910.

Gerster's paper is based on a study of 609 cases of free progressive peritonitis, which have been treated at the Mount Sinai Hospital, New York, during the past nine and one-half years. Four hundred and sixty-one of these cases were caused by appendicitis and 148 were due to injuries and affections of other viscera. Progressive peritonitis has occurred in 17 per cent of all cases of appendicitis treated in this hospital.

The author calls attention to the value of high leucocytosis in the diagnosis. A relative increase in the polynuclear cells usually indicates a virulent infection; this may be present with a moderate degree of leucocytosis.

The bacterium coli was the most frequent organism found, it being present alone in 116 cases.

Reference is made to Murphy's 49 cases with 47 recoveries. All of these cases were operated upon within forty hours after the perforation.

The following symptoms are met with in a case of progressive peritonitis:

1. Sunken features, anxious expression.
2. High rate of pulse and respiration.
3. Pronounced distention.
4. General rigidity of abdominal muscles, flexed thighs.
5. General abdominal pain.
6. General tenderness, including the pelvic peritoneum on vaginal or rectal touch.
7. Constipation, often preceded by diarrhea.
8. Frequent projectile vomiting.
9. The presence of a free movable fluid in the peritoneal cavity, proven by percussion.

All mortality in the Mount Sinai Hospital in 1889 for these cases was 79 per cent. During 1908 it fell to 14 per cent.

The treatment now followed out with these cases is, if there is vomiting, to wash out the stomach and then administer stimulants.

Gerster prefers the Kammerer incision, preferably on the right side. Eventration should always be prevented. The leak in the viscus should always be stopped. The appendix, if involved, should be removed. The operation should be rapid and no irrigation should be employed, and rubber drainage tubes with gauze wicks should be made use of instead of the former massive gauze wicks.

Paralytic ileus is treated by frequent lavage of the stomach. Opiates, the author believes, are frequently beneficial. Murphy's proctoclysis is always used with the patient in Fowler's position—8 to 10 pints will be readily absorbed. The flow must be controlled by gravity alone and never by forceps or constriction of the tube.—Murphy.

All causative factors of the remaining 148 cases are discussed.—(R. S.)

FALK, DR. EDMUND and STICKER, DR. ANTON. Ueber carbenzym (from the surgical clinic of the University of Berlin). Dir. Geh. M. Rat. Prof. Dr. Auguste Bier.

S. G. Herdin has shown that animal charcoal possesses strong anti-septic properties. When trypsin is treated with animal charcoal, the filtrate is no longer able to digest casein; when, however, the casein is brought together with the residue on the filter, digestion occurs. The antitryptic action of the charcoal is explained on the basis of an adsorption and not of a destruction of the trypsin by the charcoal; when the compound is brought together with casein it still exercises digestive functions.

This peculiar property seemed to make the compound worthy of a trial as a substitute for trypsin, pure and simple, whenever trypsin treatment seemed to be indicated.

After some interesting laboratory experiments, Falk and Sticker found that charcoal is not an antiferment, but that it only partially fixes the ferment, the reaction between the two remaining reversible and, when brought into contact with the proper substances, the ferment becomes active again.

Their experiments seem to show that, from among the different kinds of charcoal, it is more particularly the vegetable charcoal that possesses the property of adsorbing ferments as well as antiferments and which transmits its fermentative properties to the different albumins in solution with which it may come into contact. Vegetable charcoal was first used as a vehicle for trypsin, at first on some animals and then on man.

The authors report favorable results after the internal administration of carbenzym in the form of tablets every three hours, in laparotomies in which gases accumulate; also in cases of meteorism after postoperative adhesions have occurred. When employed as a dressing powder favorable results were obtained in purulent wounds after bubo-extirpation, etc.; also in fistulous affections, where they use a fine emulsion of carbenzym with a one-half per cent soda solution.

In cases of inoperable malignant tumors, they have noted considerable reduction in the size of the tumors. The action of injection of carbenzym-emulsion seems to be attended by more favorable results in sarcomatous growths than in tumors of an epithelial nature.

For further study and trial, the authors would recommend, for internal use, tablets, 3 to 5 daily; for external use, pulverized carbenzym, 2 grams, either in a dry form or in the form of a mixture of 0.5 grams with 10½ per cent sterile soda solution to be injected into the fistulous passages, hollow organs, or subcutaneously.—MEDICAL INSPECTOR H. G. BEYER.

ZUR VERTH, DR. MARINESTABSARZT. **Carbenzym bei tuberkulösen Affektionen.** Reprint from the Münchener med. Wochenschr. No. 1, 1910.

The local application of carbenzym seems to be attended by favorable results in tuberculosis of the soft parts of bones and joints. The reactions were similar to those noted in iodoform-glycerin injections.—MEDICAL INSPECTOR H. G. BEYER.

ZUR VERTH, DR. M. MARINESTABSARZT. **Ueber die dosierung der Stauungshyperämie. (On the dosage of Bier's hyperæmia.)** (From the Royal Surgical University Clinic, Berlin.) Director: Geh. Med. Rat Prof. Dr. A. Bier. Repr. Münch. Med. Wochenschr., No. 14, 1910.

Bier advocates the warm and warns against the cold hyperæmia. Warm hyperæmia is attained when the bandage compresses the veins but leaves the arteries either uncompressed or encroaches but slightly on their caliber.

Henle was the first to make use of the sleeve of the Riva-Rocci apparatus for producing hyperæmia, estimating the pressure-optimum to lie between 60 and 100 mm. Hg., an estimate believed to be too high by zur Verth.

The highest degree of hyperæmia, at the same time its most effectual degree, is reached when all possible flow in the veins is arrested, while the arterial blood flow remains unimpeded. The compression, then, begins to become dangerous when it begins to exceed

the diastolic or minimum arterial pressure. The hyperæmia-optimum must correspond to this minimal pressure.

The absolute pressure in the veins lies between 4 and 11 mm., and, though subject to variations, it remains far below this average minimal pressure of 74 mm., as indicated in the human brachial. Consequently, we would expect that a sleeve, indicating 74 mm. in a person with normal blood pressure, would stop all return flow. This, however, is not the case.

The vis-a-tergo increases the intravenous, intracapillary, and intra-arterial pressures until the effect of the compression by the sleeve is overcome.

The external sign of increased pressure in the capillaries is reddening and œdema. If, now, the optimum of the hyperæmia corresponds with the height of the minimal arterial pressure, then we would also expect to find at this pressure the greatest possible increase in the pressure in those of the arteries, capillaries, and veins situated on the distal side of the compressing bandage.

Simple as are these theoretical deductions, it takes some rather difficult blood-pressure experiments in the congested area to prove them.

The author makes use of the method of palpation by O. Müller and of that of auscultation by Korotkow. Korotkow called the attention of the profession to the fact that on the distal side of a v. Recklinghausen's sleeve, applied to the upper arm, from the moment of the beginning constriction of the vessel (minimum pressure) up to the complete constriction of the vessel (maximum pressure) there appeared an acoustic phenomenon, observable with the stethoscope.

A 15 c. c. broad sleeve was employed and air blown into it until the desired pressure was indicated on the mercury manometer. Since the auscultatory method of the pressure determination is applicable only on the upper arm, both the hyperæmia-producing and the pressure-measuring sleeves had to be applied to the upper arm, which therefore was possible only in persons with long extremities.

The results of a large number of observations are given in the form of a curve. The curve shows that the highest blood-pressure increase over the hyperæmic area lies somewhat below the pressure of the compressing sleeve. In some further observations on man, during which the hyperæmic arm could be observed for some time, zur Verth found that the best form of hyperæmia, the form characterized by Bier as warm hyperæmia, was present when the compression remained slightly below the minimum arterial pressure and that cold hyperæmia occurred when the compression exceeded this pressure.—MEDICAL INSPECTOR H. G. BEYER.

ANDERSON. The after results of the operative treatment of hemorrhoids. Brit. Med. Jour., October 30, 1909, p. 1276.

The cases studied include:

- 150 operated by means of the ligature.
- 100 operated by excision of the pile-bearing area (Whitehead).
- 50 operated by the clamp and cautery.

The pain following operation is shown in the following table:

	Severe.	Moderate.	Little.
	Per cent.	Per cent.	Per cent.
Clamp and cautery.....		30	70
Ligature.....	10	57	33
Whitehead.....	16	56	28

Use of the catheter.

- Required in 0 per cent of the clamp and cautery cases.
- Required in 10 per cent of the ligature cases.
- Required in 6 per cent of the Whitehead cases.

Sphincteric control returned in the clamp and cautery cases in an average of six days, in the ligature cases on the tenth day, and in the Whitehead cases about the twelfth day.

Contraction of the anal canal did not occur among the clamp and cautery cases; of the ligature cases 55 per cent showed a tendency to contract, and of the Whitehead there was some contraction in 64 per cent.

Hemorrhage.—(a) In the clamp and cautery cases there was one case of accidental hemorrhage “due to the carelessness of the nurse.”

(b) After the ligature operation there was one case of accidental hemorrhage and two of secondary hemorrhage.

(c) After the Whitehead there were two cases of secondary hemorrhage.

Abscess, fistula, and ulceration.—None of these complications ensued after the clamp and cautery operation; after ligature one case developed a perineal abscess and two a form of chronic infective ulceration, and the Whitehead was followed in three cases by infection and in one case by fistula.

Recurrence.—Two cases recurred, one after ligature and one after Whitehead.

Duration of stay in hospital.—The clamp and cautery cases averaged 10 days, the ligature cases 21, and the Whitehead 26.

Choice of operation.—It is better not to decide on any particular method of operation until the sphincters have been stretched, and then to use the method most suitable for the pathological condition presented.

The clamp and cautery operation should be chosen when there are not more than three piles, especially if they are of the internal variety and there are no

external hemorrhoids or redundant skin. As it is likely to give less pain than the other operations, it should be chosen for patients of a very nervous temperament. As it is a bloodless method it is suitable for cases of anemia. If time is an important question, either for the patient who may want to get back to important business, or in hospital where there is usually a large waiting list, the clamp and cautery method should be chosen, as the period of convalescence is considerably shortened. As stenosis never follows this operation, it should be used in cases in which the surgeon may be unable to see the patient again after the operation.

The ligature operation is a good and safe method, and is applicable to the majority of cases of hemorrhoids. It is suited for those cases of three, four, or five piles, especially of the mixed variety, when both external and internal hemorrhoids can be removed at the one cut. Though the conditions be less aseptic after this operation than after the others, it is a well-known clinical fact that sepsis rarely follows this operation.

The Whitehead operation is indicated in the following conditions:

(a) When there is a general hemorrhoidal condition involving the whole circumference of the anal canal, and especially if there is a good deal of prolapse, and also in cases in which there is extensive thrombosis.

(b) In cases where, though the piles may not be large, there is a pathological condition which may be described as a pre-fissure or a pre-fistula state. In this condition the anal valves are enlarged, and curious little blind submucous pockets may be found running for a varying length upward. In other cases these pockets run downward toward the anal margin. These, first described by Mr. F. C. Wallis and lately believed to be due to development defects, are undoubtedly in many cases the starting point of fistula; whilst, if Ball's theory be accepted, enlarged anal valves lend themselves to the formation of fissure.—
(H. W. S.)

MUMMERY. Some experiments on the relative susceptibility of different teeth to dental caries. *Proc. Royal Soc. Med.*, March, 1910.

Mummery contends that susceptibility to caries varies in different mouths, and that its occurrence is not determined solely by the conditions to which the teeth are subjected after eruption. He states that there are many mouths in which quantities of soft carbohydrate food lodge between and around the teeth and there undergo active fermentation and yet there is little or no resulting caries; other mouths receive most scrupulous attention and still the active caries progresses. The experiments of Black and Gassman have shown that the percentage of animal and mineral elements in the clinically hard and clinically soft teeth is identical; but Miller has pointed out that the degree of susceptibility depends rather on the chemical arrangement of the two. Attention is called to the fact that the resisting power to decay rests solely in the enamel, so the author confines his attention to it.

In these experiments the teeth were suspended in a 0.075 per cent solution of lactic acid, which is much stronger than the salivary acidity. The enamel first became chalky and as disintegration proceeded a fine white powder could be brushed off the surface; decay

was then considered to have begun. Some of the teeth were found to be 27 times as resistant as others.

The increase of acid in the saliva during severe illness and pregnancy is great enough to make decay more rapid without any reduction in the amount of mineral substance. John Hunter's experiments have shown that the composition of the enamel does not change after eruption of the tooth.

The author concludes that the susceptibility to caries is different in individual teeth; that the hardness of the enamel is determined at the time of calcification during infancy, and does not change; that the enamel has no recuperative power.—ASST. SURG. L. W. JOHNSON.

GENERAL MEDICINE.

Surgs. A. W. DUNBAR and T. W. RICHARDS, U. S. Navy.

REVIEW OF CURRENT PROGRESS IN MEDICINE.

In reviewing recent medical literature the greatest advance is seen to be in tropical medicine and in the infectious diseases. Progress, while chiefly in the line of prevention, is also to a less degree in treatment. As to the ultimate cause of infectious disease, the protozoa are attracting increasing attention. While the important part played by insects in the transmission of disease is well recognized, the discovery that animals, such as the cat, dog, rat, and ground squirrel, as well as man, are frequently the persistent carriers of infectious disease introduces a source of infection difficult to control. Notable in this respect are the typhoid, cholera, diphtheria, and plague carriers, who clinically may show little, if any, of the signs of the disease. Cats and dogs are found to be subject to diphtheria.

The presence of bubonic plague in rats and ground squirrels, which have apparently acquired an immunity to the disease, shows the difficulty in eradicating this epidemic disease. The demonstration of the infectious nature of anterior poliomyelitis, as shown by Flexner and Lewis from experiments on monkeys, is of great interest and gives promise of favorable results in prevention and treatment. Further favorable reports from the use of the Flexner serum in epidemic cerebro-spinal meningitis places this treatment upon a firm basis, and leads us to expect that a similar line of treatment may be evolved for other infectious diseases.

The rational treatment of infectious diseases by stock or autogenous vaccines, while not realizing the expectations of the most sanguine is giving encouraging results.

Leprosy is still the subject of continual research. Clegg, in Manila, reports having succeeded in growing a culture of the *Bacillus lepræ*

on a dead culture of amoeba, which, if confirmed, may prove of great therapeutic value in this disease, for which so many kinds of treatment have proved unavailing. Further investigations by Brinkerhoff, in Hawaii, have shown that the presence of an ulcer on the nasal septum, while not of as great diagnostic importance as was first reported, is nevertheless a sign of value.

The discovery that cancer, especially of the thyroid gland, is apparently hereditary, and at times epidemic in fish, particularly of the trout family, opens up a fertile field for research, and for the prosecution of which President Taft has requested congressional appropriation. It is worthy of note that greatest concentration of human cancer coincides with the part of the country where trout are most abundant. The report of the curative effect of ascitic fluid from a case of cancer which underwent spontaneous recovery is, if further corroborated, of great significance.

The etiological relation of syphilis to chronic nervous diseases, such as general paresis and locomotor ataxia, is now shown by the Wasserman reaction to be practically constant. It still remains to be determined why but 3.5 per cent of syphilitics develop these so-called parasymphilitic diseases. Opinion is divided upon this question between those attributing it to a peculiarity of the virus in some cases, which is in a measure borne out by clinical experience, and others to an idiosyncrasy of the patient, but the general trend of belief is that it is due to insufficiently prolonged treatment of syphilis by mercury.

The simplification of the methods for finding the treponema pallidum, which is now almost universally accepted as the specific cause of syphilis, tends to make possible an earlier diagnosis. This, with the Wasserman reaction as a guide for the sufficiency of treatment, should tend to decrease the incidence of these sequellæ. In connection with the inquiry as to the cause of heat exhaustion among the engineers' force aboard naval vessels, a communication from Clendering, in the Journal of the American Medical Association of May 7, 1910, on this subject is of interest. He observed that muscular cramps of great severity are common among cooks on the diners who are frequently exposed to excessively high temperatures without adequate ventilation, whereas in the better ventilated kitchens of hotels and restaurants it is uncommon.—(A. W. D.)

COLLINS, JOSEPH, M. D. The adequacy of the present-day treatment of syphilitic diseases of the nervous system. New York State Jour. Med., May 10, 1910.

The writer is of the opinion that while syphilis is a disease of far-reaching serious results, there is no other major disease which is treated in such a casual off-hand manner. The belief seems preva-

lent that mercury in small doses by mouth for several months or the administration of potassium iodide is sufficient. The latter remedy is not a true antisymphilitic, but rather an eliminant.

If the treatment is efficacious there should be a decrease in the known sequelæ, as tabes dorsalis, general paresis, myelitis, and endarteritis, unless a more careful diagnosis of these latter cases operates to cause an apparent increase.

Bordet and Gangou have demonstrated by the Wasserman and Noguchi procedures that active syphilis is present in the tissues of those showing the lesions of tabes and may be regarded as causative.

Some years ago the author called attention to the frequency of these so-called para-symphilitic diseases in those who had been under supposedly adequate treatment. Since then he has found that nearly all of these cases had been treated with potassium iodide or by mercury in pill form.

While not denying the necessity for potassium iodide in certain cases of syphilis in conjunction with mercury, it is maintained that the latter is the specific for the disease, acting directly on the treponema.

Collins is of the opinion that the endermic or hypodermic administration is the only certain method of administering mercury, and that treatment should not be discontinued until thoroughness is proven by the Wasserman test, to which the patient should submit himself yearly for five years after being discharged.

In conclusion, he believes that syphilitic nervous diseases will be decreased by carrying out the above treatment and relegating potassium iodide to its proper use, i. e., an absorbefacient of gummatous tissue.—(A. W. D.)

MATT, F. W., M. D., F. R. S. Syphilis and para-syphilis of the nervous system. Proc. Roy. Soc. Med., February, 1910.

Syphilis causes diseases of the cerebro-spinal axis, which may be classified clinically into those of the (1) brain; (2) of the spinal cord; and (3) the para-symphilitic diseases, tabes optica and dorsalis, and paralytic dementia. As a rule the entire cerebro-spinal axis is involved, one part or the other giving predominating symptoms.

Syphilitic disease of the nervous system may appear within ten weeks after the appearance of the primary lesion, and may have no other clinical symptoms.

An apparent latent case of syphilis may be awakened to renewed activity by traumatism. Syphilitic involvement of the brain is more difficult to eradicate than of the cord or other organs, and even when apparently cured is liable to recur.

The presence of a lymphocytosis of the cerebro-spinal fluid is indicative of the syphilitic or para-syphilitic nature of the disease and bears a constant ratio to its severity and to the effect of treatment. This increase in the lymphocytes is a valuable diagnostic point in differentiating syphilitic from other nervous diseases, i. e., alcoholic or neurasthenic troubles.

The Wasserman method is very trustworthy, particularly in general paralysis. In cerebral syphilis the serum is usually positive, while the cerebro-spinal fluid is negative.

The author discusses the reasons why about only 3.5 per cent of syphilitics develop para-syphilitic disease, and exhibits an interesting series of cases which would seem to indicate an inherent tendency of the virus from one subject toward the production of nervous degeneration, but believes we are on more certain grounds in attributing it to idiosyncrasy. He disagrees with Bosc, Lesser, and Herschl in regarding these late degenerations as quaternary syphilis. Anti-syphilitic treatment is believed to be generally useless and even injurious in these cases, as it lowers the vital energy in a system already hypersensitive to the syphilitic virus.—(A. W. D.)

SACCONE, DOTT. Giovanni, Capitano medica R. Marina. **La reazione di Wassermann nelle malattie cutanee.** (The Wassermann reaction in cutaneous diseases.) Ann. di Medicina Navale e Col. Anno. XVI-1910, vol. 1, Fasc. 1, January, p. 20.

According to the hypothesis, at first proposed by Wassermann in explanation of the serodiagnosis of syphilis, the phenomenon of the deviation of complement is due to the reciprocal action of the antibodies contained in the serum of syphilitics and of the antigens represented in an aqueous extract of liver from a syphilitic fetus.

Very soon, however, certain facts, brought out by Levaditti and Mariè and by Landsteiner, showed that it was not necessary to use extract from a syphilitic foetal liver, but that the extract from a normal liver could be made to serve the same purpose. Levaditti and Mariè, besides, demonstrated that the active principles contained in the cerebrospinal fluids of paralytics could not be syphilitic antibodies, because these substances were incapable of destroying or attenuating, in vitro, the syphilitic virus.

Later still, Landsteiner, Müller, and Pötzl, Porges and Meier, Levaditti and Jamanouchi, almost simultaneously, furnished observations which put the phenomenon of Wassermann into a new light. They demonstrated that the hepatic antigens consisted in a substance or complex of substances, soluble in alcohol and possessing the prop-

erties of certain compounds existing in many normal tissues; in hepatic extracts these substances could be identified, on the one hand, with the lipoids, particularly with lecithin; on the other, with bile salt.

The liver extract, therefore, in the Wassermann reaction, acts by the presence in it of lipoids and of bile salt; but the liver is not the only tissue that contains lipoids, and Levaditti and Jamanouchi have found them in brain substance, in erythrocytes, in white corpuscles, in blood serum, while Landsteiner found them in calves' hearts. "From these observations," says Levaditti, "we must conclude that the serum reactions of syphilis and of general paralysis are not due to antibodies or syphilitic antigens in the strict sense of the word and have nothing to do with *treponema pallidum*. We are rather obliged to admit that, during the course of syphilitic infections, when these are accompanied by cutaneous manifestations, that the serum becomes enriched by certain colloidal principles, possessing the properties of easily precipitating, in the presence of lipoids, acid of biliary salts and, hence, of fixing the haemolytic complement. The nature of these substances in the serum of syphilitics is unknown to us." They are closely related to the globulins and lipoids. It is supposed that during the period of glandular enlargement, and especially during the period of cutaneous symptoms, there occurs an extensive destruction of material rich in globulins and lipoids which pass into the serum which itself contains normally such substances in smaller quantities.

"In brief, between normal and syphilitic sera, the differences are of a quantitative rather than of a qualitative character, because the reaction of Wassermann is due to principles of histogenic, not of bacteriogenic, origin" (Levaditti and Jamanouchi). Sampietro, studying complement deviation in cases of carcinoma, obtained positive reactions in four cases of ulcerative cancer, with the use of lecithin and sod. glycocholate, while in cases in which the tumors were nonulcerative, positive reactions were obtained only with extracts from cancers. Sampietro explains these results in harmony with the hypothesis of Levaditti and Jamanouchi, admitting that in ulcerative cancers an intense destruction of cellular tissue, especially cutaneous tissue, occurs, and to which the enrichment of the serum in lipoids and salts may be due.

Consequently, if anything centers in the entry into the circulation of these substances which are of histogenic and not of bacteriogenic origin, substances, moreover, contained in normal serum in small quantities, the question arises whether a positive reaction of Wassermann may not be demonstrated in nonsyphilitic individuals, but affected with other extraneous diseases.

With this object in view, Saccone examined 13 with eczema, 6 cases of psoriasis, 4 cases of pemphigus, 2 cases of erythema, 4 cases of varix, and 1 case of elephantiasis, employing the exact methods and under all due regard to controls. His results were that the reaction of Wassermann was completely negative in all cases examined by him. The conclusions are, therefore, that the reaction of Wassermann maintains its specificity for syphilis.—MEDICAL INSPECTOR H. G. BEYER.

ADAMS, H. C., Staff Surg. R. N. **Treatment of syphilis by intramuscular injection of metallic mercury.** Proc. Roy. Soc. Med., April, 1910.

A plea is made for a uniform treatment of syphilis in the Royal Navy. Up to 1898 the administration of mercury was almost entirely in the form of pills and mixtures, and this is continued by many at the present time. Many objections are urged to the internal administration as well as to the inunction method. Adams recommends the intramuscular injection of mercurial cream made according to the following formula: mercury 20 parts, anhydrous lanolin 30 parts, chlor. butol 2 parts, by weight, to liquid paraffin 100 parts, by measure. This gives a stable cream with the mercury in a state of minute subdivision. The injections are given deep into the gluteal muscles, the needle being watched to see there is no hemorrhage which would indicate perforation of a blood vessel. The amount injected is 1 grain once a week in the robust and one-half grain in those whose mouths are in a septic condition. Six doses usually constitute the first course, but the continuance of the treatment is dependent upon the effect, avoiding overdosing.

Upon discharge a sheet showing the number, dose, and date of last injection is transferred with the man. Two years' experience with this treatment at Hasler has given excellent results. In the discussion on this paper Major Blenkinsop, R. A. M. C., doubts the efficacy of the two years' treatment, which should, service conditions permitting, be longer. Major Pollock lays stress upon the importance of examining the urine prior to this treatment, as he attributes the occasional serious results reported to the use of the intramuscular method where nephritis is present.—(A. W. D.)

PHILLIPS, L. **On the treatment of tetanus by the intraspinal injection of a solution of magnesium sulphate, with cases.** Proc. Roy. Soc. Med., January, 1910.

The writer finds from the reports of the St. Bartholomew Hospital for the years 1895 to 1907, during which period the tetanus antitoxin was used, that the mortality for tetanus was 56 per cent. During

three years, 1906–1908, 75.8 per cent succumbed to this disease at the Kasrel-Amy Hospital in Cairo, Egypt.

An analysis of the cause of death in tetanus shows the immediate cause of death to be either toxæmia, exhaustion from muscular spasms, insufficient nourishment, or respiratory failure. The indications for treatment are four: (1) Destruction of the toxin-forming focus; (2) the use of tetanic antitoxin; (3) the relief of the muscular spasms; (4) the conservation of the strength. Phillips gave up the use of the antitoxin some time ago, because of unsatisfactory results.

Magnesium sulphate acts as a palliative, relieving muscular spasms. A 25 per cent solution is used, in amounts equal to 1 c. c. to each 25 pounds of body weight. The usual technique is observed, allowing escape of a small amount of cerebro-spinal fluid.

Chloroform may be required during the operation. The treatment is given once daily, or oftener if required to maintain flaccidity of muscles.

The mortality in 28 cases treated by this method was 42.8 per cent. The treatment is not free from danger, especially of respiratory failure, to avoid which it should be given in the sitting position if possible.

Bronchorrhœa and cardiac failure are also sequelæ. The author is of the opinion that the reduction in mortality is sufficient to justify more extended trial, as it possibly retards death, allowing the advantageous use of antitoxin.—(A. W. D.)

SQUIRE, J. EDWARD. C. B., M. D., F. R. C. P. Hospital infection of tuberculosis. *British Med. Jour.*, April 30, 1910.

The records of the Mount Vernon Hospital for consumption for fifteen years are reviewed to determine the degree of infection of the resident, nursing, and medical staff in a well-regulated sanatorium.

Physical examination of all applicants for employment was made and evidence of past or present tuberculosis was found in 14 per cent of the nurses and in 8 per cent of the maids.

By examination upon discharge of those resident in the hospital for over three months the percentage of tubercular infection was found to be 4.18 in the nurses and 4.38 in the maids, which includes possible reinfection of those who showed signs of previous tuberculosis.

From these figures it would seem that the danger from infection in these institutions is small, and little, if any, greater than in a general hospital or among the mass of town dwellers.—(A. W. D.)

WHITE, WILLIAM A. (M. D.). *Current conceptions of hysteria.* *Interstate Med. Jour.*, Vol. XVII, No. 1, January, 1910.

It is only within recent years that it has been possible to approach this subject from a scientific standpoint, and the results of such investigations are admirably reviewed by the writer. The dominant note to-day is the conception of hysteria as a psychosis, not a neurosis, and psychological theories as to its origin are now most widely accepted. As best explaining these views, he refers to certain experimental work by Binet, of which the following, briefly stated, is an illustration: An anesthetic hand and arm, screened from the hysteric's view, may grasp a pen, trace words, correct errors, and perhaps write page after page with no knowledge on the patient's part of what is occurring. Clearly the hand is actuated by an intelligence, and Binet concludes that there is here a double consciousness, two streams, "relatively independent and separated by an amnesia."

Further experiments along these lines by Sidis and White not only confirm this view, but indicate that it is the submerged stream of consciousness, i. e., that with which areas of hysterical anesthesia are connected, which is "temporarily brought to the surface during hypnosis, but sinking back again during the waking, normal state."

These results lead directly to the modern "dissociation" theories of hysteria, such as Janet's. For Janet there exists in consciousness a region below the normal waking or personal consciousness, which is called the subconscious. Groups of ideas may exist in this twilight region without being at all clearly perceived by the individual, in fact without being known at all, and yet they may operate to produce results very much as if they were the subject of voluntary attention. The hysteric in an access of delirium lives through fancied experiences about which he knows nothing when he "comes to;" he has an amnesia for all of these events. With this there is a "disorder of attention:" directions and sensations "drop at once into the region of the subconscious," so that with the anesthetic hand, for example, the patient did not sufficiently attend to the sensations to perceive them. Thus there is a constant enrichment of the subconscious stream at the expense of the personal consciousness, so that the personality is split up or "doubled" by this disintegrating process. A prominent feature of Janet's theory is that the hysterical and hypnotic states are identical; as White puts it, "to be suggestible is to be hysterical, and only hysterics can be hypnotized."

Sidis's theory is similar, but he lays more stress on the independent, automatic activity of the subconsciousness; split-off groups of associated ideas tend always to become dynamic, energy accumulates until an explosion breaks over the gap separating them from the personal consciousness, and a paroxysm occurs. His principle of treatment is reassociation, to synthesize the two states of consciousness into one,

and as a patient so cured is no longer hypnotizable, Janet's position is strongly confirmed. Sidis postulates a surplus of psychic energy (just as we have more of liver, more of kidney, etc., than is necessary for our ordinary needs), which is available in the "hypnoidal" state (i. e., one between sleeping and waking, on the one hand, and hypnosis, on the other) for the hysteric's cure.

Breuer and Freud traced the cause of dissociation to psychic trauma—a single severe shock or a multitude of small ones. While a painful effect fully reacted to at the time may produce no harm, if, for any reason, reaction fails and the feelings are contained and repressed, the possibilities of dissociation are created. Very recently Freud has expressed the extreme view that every case of hysteria originates in a trauma of sexual nature, which must, moreover, have occurred in childhood.

White considers the so-called "hysteriform" accompaniments of various mental diseases and neuroses as being true hysteria; multiple sclerosis, for example, may be simply the activating agent in breaking down the resistance and producing the characteristic response in one with latent hysterical tendency. He also dissents from Babinski and others who would exclude from the realm of hysteria all phenomena apparently purely physical, such as disturbances of the tendon reflexes, cutaneous ecchymoses, etc. "As between the most definitely physical of bodily processes on the one hand and the highest psychic on the other, an infinity of gradations exists, and at no point can it be said that what was one has become the other."

In confirmation of these views he cites the interesting case reported by Prince, of a severe attack of hay fever brought on by the unexpected production of a bunch of paper roses.—(T. W. R.)

BRILL, NATHAN E., A. M., M. D. **An acute infectious disease of unknown origin.**
Am. Jour. Med. Sciences, April, 1910.

Based upon an experience of 221 cases, the writer invites attention to an acute infectious disease which he believes to be a distinct clinical entity, though commonly accepted as merely an abortive type of typhoid fever. The syndrome he presents, however, is not strongly suggestive of typhoid, the disease being "of definite duration, twelve to fourteen days, having a most extensive nonroseolar eruption, giving no clinical signs of intestinal ulceration, with Widal reaction invariably absent at all times of the disease, with no organisms in the blood at any time during its course, and with a fever that falls by crisis." As there have been no fatal cases observed, the pathology is uncertain.

The disease is most prevalent in summer, males are affected more frequently than females, and the period of life between the 20th and

40th years seems to show greatest susceptibility; there is no evidence to indicate that it is directly communicable. That the ingestion of certain foods may have been an etiological factor in these cases seems highly improbable, the disease being of distinct type, with an unvarying eruption and running a definite course without special prevalence in certain districts or single families.

The writer believes that the disease he describes so strongly resembles typhus that during an epidemic of the latter it would be impossible to clinically differentiate cases; but to consider them identical it would be necessary to assume that typhus has, for years, prevailed in New York in a noncommunicable form, having lost its grave nervous symptoms and toxemia and being no longer a virulent and fatal disease. But since nearly all his colleagues in New York have considered these cases as typhoid fever, the following differentiation is given in extenso:

Typhoid.

Usually long incubation.
Onset not commonly abrupt.
Fever; gradually increasing ascent of temperature to fastigium—in all about ten days.
Remissions of temperature occasionally more than a degree.
Fall usually by gradations to normal, taking commonly one week.
Eruption, circumscribed, lenticular, papular.
Distribution, chiefly, back, and abdomen, seldom appearing on upper and lower extremities; almost unknown on palms and soles.
Eruption appears in crops throughout the disease.
Spots rarely confluent, and then confluence of but two spots.
Roseola disappearing on pressure.
Petechial spots (hemorrhagic) very rare.
Apathy and prostration late in development.
Labial herpes rare.
Diarrhea fairly common.
Hemorrhages from the bowel often observed.
Headache disappears in second week.
Relapses observed by all observers.
Widal reaction positive in over 95 per cent of the cases.
Blood cultures positive in over 90 per cent of the cases.
Convalescence slow.

Unknown infection.

Short incubation, four to five days.
Commonly with chill or chilly sensation.
Fastigium reached in three days.
Rarely more than one degree.
Fall commonly by *crisis*, not longer than sixty hours.
Maculopapular, periphery indistinct and irregular.
Distribution in addition to trunk on upper and lower extremities not infrequent, on palms and soles occasionally.
Does not appear in crops.
Confluence may occur with three or four spots forming a number of patches.
Erythema, not disappearing on pressure.
Petechiæ occasionally.
Apathy and prostration early.
Labial herpes in 6 per cent of the group.
Constipation an almost invariable accompaniment.
No intestinal hemorrhages or blood in feces.
Is more intense and lasts throughout the disease.
Relapses have never occurred.
Widal reaction invariably absent.
Blood cultures invariably negative.
Convalescence speedy.

(T. W. R.)

REPORTS AND LETTERS.

REPORT ON UNITED STATES PHARMACOPŒIAL CONVENTION, 1910.

By Pharmacist PAUL J. WALDNER, U. S. Navy.

In obedience to the department's order of December 20, 1909, I have the honor to submit the following report on the proceedings of the United States Pharmacopœial Convention, held at Washington, D. C., May 10, 1910, for the ninth decennial revision of the pharmacopœia of the United States.

The convention assembled at 10 a. m. on the above date, with Dr. Otto A. Wall, of St. Louis, second vice-president, presiding.

Hon. Charles Nagel, Secretary of Commerce and Labor, greeted the convention on behalf of the Government. Changes in the constitution and by-laws, affecting representation in the convention and details of organization, were adopted with certain modifications, and officers for the next decennial period were elected. Dr. Harvey W. Wiley, of Washington, D. C., was chosen president of the convention.

The general principles to govern the committee of revision, voicing the opinion of the convention body on the scope and character of the next pharmacopœia, were then debated and formulated. Briefly it was determined to confine the subject-matter to substances used primarily in medicine and to include such articles as may be necessary to establish their purity and identity; the adoption of biologic standards, wherever practicable, was recommended; therapeutically suggested titles are to be eliminated; official synonyms are to be designated for certain substances and preparations in order that articles sold under these names may come within the jurisdiction of the pure food and drug act; adoption of the formulas for potent remedies suggested by the International Conference for the Unification of Formulas * * * was recommended; the retention and introduction of composite preparations is to be discouraged and articles made by secret processes and controlled by unlimited proprietary or patent rights are to be excluded; recommendation was made for the adoption of a standard medicine dropper, which would deliver a definite quantity of distilled water at a given temperature; supplements to the pharmacopœia, to be issued from time to time in the discretion of the revision committee, were authorized.

During the discussion on ways and means to increase the revenues of the convention a resolution was passed authorizing the board of trustees to take steps to collect royalties on books using the pharmacopœial text. The proposition to increase the revenues by assessing the bodies having representation in the convention was voted down. Debate on this subject clearly indicated that any tax on representation in the convention would lead to the withdrawal of many organizations whose cooperation in revision is of great value, and thus leave this important work to a comparative few.

Before proceeding to adjourn at 1 p. m., May 12, the convention expressed its appreciation of the work of the retiring president, Dr. Horatio C. Wood, of Philadelphia, by a rising vote of thanks.



NO. 4

VOL. 4

UNITED STATES NAVAL MEDICAL BULLETIN

FOR THE
INFORMATION OF THE MEDICAL
DEPARTMENT OF THE SERVICE

LIMITED TO PROFESSIONAL MATTERS AS OBSERVED BY MEDICAL
OFFICERS AT STATIONS AND ON BOARD SHIPS IN EVERY
PART OF THE WORLD, AND PERTAINING TO THE PHYS-
ICAL WELFARE OF THE NAVAL PERSONNEL

OCTOBER, 1910

(ISSUED QUARTERLY)



WASHINGTON
GOVERNMENT PRINTING OFFICE
1910

NAVY DEPARTMENT,
Washington, March 20, 1907.

This United States Naval Medical Bulletin is published by direction of the department for the timely information of the Medical and Hospital Corps of the Navy.

TRUMAN H. NEWBERRY,
Acting Secretary.

SUBSCRIPTION PRICE OF THE BULLETIN.

Individuals to whom this publication may not be sent officially may obtain it upon mailing the cost price in currency or money order to the Superintendent of Documents, Government Printing Office, Washington, D. C.

Single numbers cost 25 cents domestic postage and 31 cents foreign postage prepaid.

Yearly subscriptions (beginning January 1) are \$1 domestic postage and \$1.25 foreign postage prepaid.

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PREFACE.

The publication and issue of a quarterly bulletin by the Bureau of Medicine and Surgery contemplates the timely distribution of such information as is deemed of value to the medical officers and the hospital corps in the performance of their duties, and with the ultimate object that both shall continue to advance in proficiency in respect to all of their responsibilities.

It is proposed that the Naval Medical Bulletin shall embody matters relating to hygiene, tropical and preventive medicine, pathology, laboratory suggestions, chemistry and pharmacy, advanced therapeutics, surgery, medical department organization for battle, and all other matters of more or less professional interest and importance under the conditions peculiar to the service and pertaining to the physical welfare of the naval personnel.

It is believed that the corps as a whole should profit, to the good of the service, out of the experience and observations of the individual. There are many excellent special reports and notes beyond the scope of my annual report being sent in from stations and ships, and by communicating the information they contain (either in their entirety or in part, as extracts) throughout the service, not only will they be employed to some purposes as merited, but all medical officers will thus be brought into closer professional intercourse and be offered a means to keep abreast of the times.

Special attention will be given by the instructors of the Naval Medical School to the review of advances in medical science of special professional interest to the service, as published in foreign and home journals, and extracts from these will appear in the bulletin, together with such remarks as the instructors may deem of value to officers on foreign service or sea duty.

Information received from all sources will be used, and the bureau extends an invitation to medical officers to prepare and forward, with a view to publication, matter on subjects relating to the profession in any of its allied branches.

C. F. STOKES,
Surgeon-General U. S. Navy.

SPECIAL ARTICLES.

INSANITY IN THE NAVY.

By Passed Asst. Surg. HEBER BUTTS, U. S. Navy.

In the Government Hospital for the Insane, Washington, D. C., are gathered together more than 2,900 mental and nervous bankrupts. In this institution have congregated for years the majority of the insane of the navy. Many of these "many men of many minds" could hardly be said to have any minds, as we understand the term, so demented have they become. In this most interesting community, however, there are, as in most communities, a few men of positive genius, even though their mental wires, so to speak, have become tangled and crossed. Few of them are in actual pain, while the euphoria and apparent happiness of many might almost excite our envy. Others are morose and melancholy, full of phobias and fears of impending evil, and the scope of their delusions and hallucinations encompasses the entire range of human experience and imagination.

The mental patrimony of many of the insane men of the navy was squandered by their dissipated ancestors long before they entered the service; others began life well, but their mental capital was limited, and in the struggle for an existence it was nearly all expended prior to their entry into the service, so that they really enlisted as psychopaths. These psychopaths have, for the most part, been the shiftless, irresponsible men of the service. Prior to their enlistment an unduly large proportion of them have been professional tramps or hoboes, and after their entry into the service they become malingerers and general court-martial prisoners.

In the past ten years insanity has become apparent within fifteen days after enlistment in 15 cases. Just at this time an insane enlisted man of the navy is being admitted to the hospital whose disease, "dementia praecox," became apparent within four days after enlistment. There are 69 insane enlisted men not yet discharged from the Navy or Marine Corps now at this hospital. Of this number there are only 8 cases in which there is reason to believe that the mental disease originated in the line of duty. In all other cases the mental disorder, or the predisposition thereto, either existed prior to enlistment or it was due to causes not in line of duty, such as alcohol and syphilitic infection.

During the period January 1, 1899, to June 1, 1910, I find that there have been 634 admissions of insane men of the **Navy and Marine Corps** to this institution. Of this number, 34 cases have been readmissions and 72 cases have been retired officers, **naval beneficiaries**, and supernumeraries who could not properly be **considered** in the same statistical tables with those men who just prior to their admission into the hospital were performing active service in the **Navy or Marine Corps**. We have remaining 528 cases of insanity from the active lists of the services during the period named which have upon one or more occasions been admitted to the hospital.

TABLE No. 1.

	Number.	Naval patients.	All hospital patients.
		<i>Per cent.</i>	<i>Per cent.</i>
Recovered.....	260	49.24	33.08
Improved.....	36	6.81	16.32
Unimproved.....	6	1.14	2.96
Died.....	35	6.64	32.27
Not insane.....	14	2.65	
Remaining.....	177	32.52	15.93
Total.....	528	100.00	100.00

In Table No. 1 I have made a comparison for this period of the percentages of the insane men of the navy who have been discharged "recovered," "improved," unimproved," "not insane," or who have died in the hospital, and those remaining in the hospital, with like percentages for the same period for the total number of patients in the hospital. In computing percentages for the whole hospital, those discharged "not insane" are included in the percentage of "recoveries." In that portion of the table which relates to the navy, a separation of these facts is made, as it is interesting to know how many men of the service were admitted to the hospital who manifested no symptoms of mental disorder after their admission. The conspicuous features of this table are the large number of recoveries—49.24 per cent—and the very small number of deaths—6.64 per cent. Undoubtedly the 14 men who were discharged as "not insane" were convalescing from their attack of nervous or mental disorder upon admission to the hospital.

TABLE No. 2.

Age.	Number.	Per cent.
Under 20.....	21	3.96
Between 20 and 30.....	334	63.26
Between 30 and 40.....	138	26.13
Over 40.....	35	6.63
Total.....	528	100.00

From Table No. 2 we learn that 67.24 per cent of the insanity of the navy occurs in men under the age of 30 years. This is probably because at least that percentage of men in the navy is under 30 years of age. Statistical data on this point are not conveniently available.

TABLE NO. 3.

Nativity.	Number.	Per cent.	Percentage of enlistments per annum.
United States.....	414	78.41	85.38
Ireland.....	42	7.95	1.91
Germany.....	14	2.65	2.22
Sweden.....	14	2.65	1.01
England-Wales.....	6	1.14	.90
Japan.....	4	.76	.87
Norway.....	4	.76	.69
Other countries.....	30	5.68	7.02
Total.....	528	100.00	100.00

In Table No. 3 is given the number and percentage of native and foreign born men in the service who have become insane and the percentages of enlistments per annum. The percentages of enlistments per annum are *not* estimated for the entire period covered by the table, but are averages only for the four fiscal years 1906-1909. Moreover, these percentages pertain *only* to the United States Navy proper, while the first three columns of Table No. 3 refer to the United States Navy and Marine Corps *taken as a whole*. Statistical data for the *entire* period covered by the table for both the Navy and Marine Corps are not available, so percentages for the entire period can not be estimated. The percentages given, however, are believed to be fair indicators of what the percentages for the whole period for both the Navy and Marine Corps would be, and may reasonably be accepted as such.

Of the foreign born, Ireland has furnished a conspicuously large number of insane men, while her average annual percentage of enlistments has been relatively small, the ratio being 7.95 per cent insane men to 1.91 per cent enlistments. Germany, on the other hand, has furnished a much larger average annual percentage of enlisted men than any other foreign country, and a relatively small percentage of those men have become insane—very much smaller than Ireland—the ratio being 2.65 per cent insane men to 2.22 per cent enlistments. I find upon investigation that the hospital records bear out even more strikingly the fact that Ireland furnishes a relatively large percentage of insane men. The Government Hospital for the Insane was opened in 1855. From that date up to and including June 30, 1909, there have been admitted into the institution 5,865 foreign-born insane patients. Of this number 2,282 were born in Ireland and 1,614 were born in Germany. These facts all strongly

indicate that Ireland furnishes the United States far more psychopathic individuals than any other country. They also point the moral that more caution should be exercised in accepting men of Irish birth for enlistment.

In this connection it is noteworthy to state that only one insane Filipino, a musician, has thus far found his way into the hospital. It is convenient at this place to state also that no commissioned officer of the United States Marine Corps has yet, as a patient, been admitted to the Government Hospital for the Insane.

TABLE No. 4.

Rank or rate.	Number.	Percent.	Number of men in service June 30, 1908.	Percent.
Commissioned officers and midshipmen	6	1.14	2,752	5.66
Warrant officers and mates	14	2.65	512	1.05
Enlisted men:				
Machinist's mate	7	1.33	987	2.03
Boatswain's mate	4	.76	691	1.42
Gunner's mate	3	.57	1,075	2.21
Coal passer	89	16.85	3,691	7.59
Fireman	49	9.28	4,181	8.60
Seaman	90	17.04	15,006	30.87
Oiler	11	2.08	770	1.58
Landsman	23	4.35	247	.51
Mess attendant	15	2.84	1,135	2.34
Hospital apprentice	8	1.51	620	1.27
Electrician	7	1.33	1,284	2.64
Water tender	7	1.33	781	1.61
Musician	7	1.33	646	1.33
Yeoman	5	.95	900	1.85
Coxswain	8	1.51	814	1.67
Ship's cook	5	.95	1,065	2.19
Painter	3	.57	203	.42
Blacksmith	3	.57	159	.33
Master at arms	3	.57	540	1.11
Hospital steward	3	.57	229	.47
Plumber and fitter	3	.57	130	.27
Boiler maker	4	.76	156	.32
Shipwright	3	.57	148	.30
Baker	2	.38	228	.47
Cabin steward	2	.38	115	.24
Bugler	1	.19	150	.31
Steering steward	1	.19	42	.09
Coppersmith	1	.19	76	.16
Quartermaster	1	.19	618	1.27
Commissary steward	1	.19	83	.17
United States Marine Corps:				
Sergeant (gunnery and quartermaster)	12	2.27	700	1.44
Corporal	1	.19	685	1.41
Drummer	1	.19	69	.14
Private	125	23.66	7,117	14.66
Total	528	100.00	48,605	100.00

In Table No. 4 is shown the rank or rate of those of the active list of the Navy and Marine Corps who have become insane, the percentage of each rank or rate becoming insane, the number in each grade during one year, and the average percentage in each grade of the services during one year. The percentages in the fifth column of Table No. 4 are based upon the officers and men actually in the services during the fiscal year ended June 30, 1908, and are only estimated for the grades represented in the table. Many grades in the services do not

appear in the table, and therefore these percentages can not be taken **a**s representing the true percentage for all grades in the services. **S**tatistical data for the entire period covered by the table and for all **g**rades are not conveniently available. The percentages for the one **y**ear given, however, are believed to indicate fairly accurately the **r**elative percentage of men in each grade in the services. From the **t**able it will be seen that the ratings of seaman, coal passer, fireman, and landsman furnish the bulk of the insanity of the navy, while **n**early one-fourth of the insanity in the Navy and Marine Corps is furnished by privates in the latter service.

It will be observed also that the percentage of privates in the United States Marine Corps, considered with the navy as a whole, is relatively very small, while the percentage of privates becoming insane is relatively very high. This deplorable state of affairs is due to the fact, I am disposed to believe, that a large percentage of the recruiting work for the United States Marine Corps is performed by civilian physicians, many of whom, from lack of experience in the service, fail utterly to appreciate the type of men desired. On this account many potentially and actually insane men are enlisted in the Marine Corps. A very different state of affairs exists in the case of seamen becoming insane in the navy. The physical and mental conditions of all enlisted men in the navy are passed upon by the medical officers of the service before the men are accepted for enlistment. This fact enables us to read a very different story from the results of the enlistment of men in the navy. In the same parallel columns of Table No. 4 we find that the grade of seaman constitutes approximately 30.57 per cent of the personnel of the two services taken as a whole (but taking no account of the unrepresented grades), while only 17.04 per cent of the insanity in the two services occurs among the seamen of the navy. Something more than mere coincidence is necessary to explain these widely varying ratios between these two branches of the services, and it seems to me quite improper to attribute the unduly large percentage of insanity among privates in the Marine Corps to greater stress of service than that to which seamen in the navy are subjected.

TABLE No. 5.

Psychosis.	Number.	Per cent.	Whole hos- pital ad- missions, fiscal year 1909.
Dementia praecox.....	177	33.52	237
Manic-depressive (circular insanity; recurrent mania).....	43	8.14	72
Acute melancholia.....	90	17.04	.....
Acute mania.....	37	7.01	.....
Acute dementia.....	13	2.46	.....
General paresis.....	27	5.11	50
Chronic melancholia.....	15	2.84	.....
Epileptic psychoses.....	11	2.08	16
Confusional insanity.....	12	2.27	.....
Imbecility.....	9	1.70	8
Paranoia.....	7	1.33	38
Chronic dementia.....	4	.76	.....
Traumatic insanity.....	3	.57	1
Chronic mania.....	1	.19	.....
Organic dementia.....	1	.19	.....
Terminal dementia.....	1	.19	.....
Delirium tremens.....	2	.38	.....
Alcoholic hallucinosis.....	5	.95	.....
Acute alcoholism.....	1	.19	.....
Korsakow's psychosis.....	1	.19	.....
Intoxication psychoses:			
Alcohol.....	16	3.03	54
Morphine.....	2	.38	1
Cocaine.....	2	.38	1
Potassium bromide.....	1	.19	2
Cerebral syphilis.....	2	.38	5
Infection-exhaustion psychoses:			
Malaria.....	2	.38	.....
Typhoid fever.....	1	.19	.....
Confusion in a degenerate.....	1	.19	.....
Hysteria with depression.....	1	.19	9
Psychasthenia.....	1	.19	4
Involution melancholia.....	1	.19	9
Acute hallucinosis.....	1	.19	2
Depression in a psychopath.....	1	.19	5
Acute psychosis in a psychopath.....	1	.19	.....
Unclassified excitement.....	1	.19	15
Not insane.....	14	2.65	11
Not yet diagnosed.....	20	3.79	.....
Total.....	528	100.00	.....

The forms and percentages of psychoses with which the insane of the Navy and Marine Corps have suffered, as diagnosed by the hospital authorities, are shown in Table No. 5. Some idea of the general prevalence of some of these types of mental disorder may be gleaned from the fourth column of this table, the data for which I have taken from the "Report" of the hospital for the fiscal year ended June 30, 1909. This table is not as accurate as it might be, owing to the fact that the whole system of classification of mental diseases was changed in 1905, and this will account for the gaps in the fourth column. Under the new classification many, probably all, of the cases of "acute melancholia" and "acute mania" would shift into the modern classification of "manic-depressive insanity." In this class I have taken the liberty of including one case of "circular insanity" and one case of "recurrent mania." because under the new classification a diagnosis of manic-depressive insanity would almost

certainly be made. The cases of "acute" and "chronic dementias," "paranoia," "chronic melancholia," and "terminal dementia" would probably shift into the "dementia præcox" class. The diagnoses "acute mania" and "acute melancholia" are no longer tenable, while the diagnosis of true paranoia is all but untenable owing to its extreme rarity. The cases so diagnosed are usually classified at the Government Hospital for the Insane as "paranoid states," or the paranoid type of dementia præcox. The rarity of true paranoia may be inferred from the fact that of over 2,900 patients now undergoing treatment at the hospital named but three or four are considered to be true paranoia, and those three or four are not from the Navy or Marine Corps. The 38 cases of "paranoia," tabulated for convenience in the fourth column of Table No. 5, are really only "paranoid states," and, strictly speaking, should not be called "paranoia."

From our present knowledge it seems likely that the classification as given might be reclassified as follows, and thereby be more in harmony with modern conceptions:

1. Dementia præcox (including former diagnoses of acute dementia, chronic dementia, chronic melancholia, chronic mania, terminal dementia, and paranoia).
2. Manic-depressive insanity (including former diagnoses of acute mania and acute melancholia).
3. General paresis.
4. Psychoses associated with other diseases (hysteria, epilepsy, traumatic insanity, cerebral syphilis).
5. Toxic psychoses (alcohol, opium-morphine, cocaine, etc.), including delirium tremens, alcoholic hallucinosis, acute alcoholism, and Korsakow's psychosis.
6. Infection-exhaustion psychoses (malaria, typhoid fever, etc.).
7. Miscellaneous class (acute hallucinosis, unclassified excitement, depression in a psychopath, confusion in a degenerate, psychopathic individual, etc.).
8. Involution melancholia.
9. Psychasthenia.
10. Imbecility.
11. Not insane.
12. Diagnoses not yet made.

TABLE No. 6.

Etiological factor.	No.	Etiological factor.	No.
Alcoholism	169	Cerebral thrombosis	1
Heredity	59	Love affair	1
Epilepsy	11	Rheumatism	2
Heat or sunstroke	55	Concussion from heavy gun	2
Nostalgia	25	Pleuro-pneumonia	1
Worry	19	Ill health	2
Overwork	7	Neurasthenia	2
Syphilis	56	Adolescence	4
Malaria	35	Chronic leptomeningitis from	
Head injury	33	hardships in field	3
Constitutional inferiority	33	Epidemic influenza	5
Congenital	16	Unaccustomed environment	7
Masturbation	16	Tuberculosis	1
Tropical climate	11	Moral shock	1
Service aboard ship	10	Mental and physical stress	2
Hardships of war	1	Cerebral hyperaemia	1
Dysentery	1	Necrosis of femur	1
Ridicule of shipmates	1	Confinement in prison	9
Severe mental strain	1	Surgical operation	1
Organic brain disease	1	Torpedo-boat service	1
Domestic troubles	3	Exposure in service	1
Abscess of ear	1	Potassium bromide poisoning	1
Chronic ear disease	1	Speculation in stocks	1
Heart disease	1	Parents first cousins	1
Gonorrhea	2	Religion	1
Christian science	1	Death of wife	1
Meningo-encephalitis	3	Target practice	1
Typhoid fever	7	Stress of service	6
Injury to spine	1	Fall from hammock	1
Dyspepsia	2	Optic neuritis	1
Eye injury	1	Sexual excesses	6
Psychopathic constitution	9	Neuropathic disposition	1
Cocaine	6	Spinal sclerosis	1
Opium	3	Undetermined	103
Traumatism	2		

Table No. 6 is interesting as showing the large number of factors which have in the past eleven or twelve years been considered as predisposing or exciting causes of naval insanity. It will be understood, of course, that very frequently two or three, or even four, of the factors given in the table have acted as etiological factors in one case of insanity, and that is why the list is so long. Many of the factors, such as "domestic troubles," "love affair," "death of wife," "nostalgia," "worry," etc., might have been included under one caption, while other etiological factors, such as "masturbation" and "sexual excesses" are no longer considered causes of insanity, but *symptoms* of insanity.

Next in importance to alcohol, bad heredity and syphilis, heat or sunstroke, seems to have been the most frequent etiological factor.

In those cases in which heat stroke or sunstroke is given as a cause of insanity, it is very difficult or quite impossible to determine the relative importance of the attack of heat or sunstroke as an etiological factor, because other factors, such as heredity, alcohol, and malaria have also frequently acted as contributory causes. I have in mind one man, aged 25 years, who, just prior to his enlistment as machinist's mate, had an attack of typhoid fever. This young man was also a morphine habitue, and possessed several anatomical stigmata of degeneracy. In this case it is easy to understand how the heat of the engine room very likely acted as an exciting cause in the development of a psychosis in a man whose mental stability was already much impaired by morphine and the exhaustion of the attack of typhoid fever. Many of the cases of heat or sunstroke given in Table No. 6 antedated the insane men's enlistment, so service conditions could only be charged with acting as a possible exciting cause in individuals already predisposed to insanity. There can be no doubt, however, that the heat of the engine and fire rooms has in a good many cases acted as the determining factor in producing insanity in psychopathic individuals. Yet, when we consider the many thousands of men who have been employed for long periods of time in the firerooms of the battle ships of the navy, and in tropical climates, and who have not suffered with heat or sunstroke, or developed a psychosis, and contrast them with the comparatively few men of those thousands who have had an attack of heat or sunstroke, and the yet fewer number of men so affected who have developed a psychosis, or shown evidence of mental impairment, we can hardly escape the conclusion that those few who did develop a psychosis must have originally possessed a strong predisposition to insanity. And an examination of such patients and their histories usually shows such to be the case. The heat of the engine room may, I feel sure, be said to be a measure of cerebral resistance, the unstable, predisposed individual being affected much more quickly than a normal individual. Dr. William A. White is authority for the statement that the same is true of alcohol.

It will be noticed that "nostalgia," "service aboard ship," "unaccustomed environment," "torpedo-boat service," "confinement in prison," and "stress and exposure in service," are mentioned as etiological factors of naval insanity in Table No. 6. In reference thereto I feel that I am well within the truth in stating that it is only the fundamentally abnormal individual whose mentality becomes impaired under such circumstances. Such factors as those named will not affect a normal mental make-up. It is only the abnormal individual who goes down, mentally, under the stress of such conditions in the first three or four months of his enlistment. The mentality of these people is of such a character that they have learned to do certain things in a certain way—they have acquired a line of habits,

both physical and mental, and when they attempt to change those old habits and form new ones the attempt to change results in confusion. So in the last analysis it is the individual, or subjective thing, with which we have to deal, rather than the environment. The *change* in environment only brings about the mental reaction. A normal individual has a wonderful power of adaptation to almost any environment without suffering mental impairment.

By way of contrast, and to give some idea of the causes of mental diseases in the total number of male and female patients admitted to the Government Hospital for the Insane, I give below an abstract of a table of etiological factors taken from the "Report" of that institution for the fiscal year ended June 30, 1909:

<i>Causes.</i>	<i>Number.</i>
Mental stress, worry, and overwork.....	28
Love affairs.....	2
Emotional shock.....	4
Syphilis.....	45
Syphilis and trauma.....	1
Chronic alcoholic intoxication.....	54
Alcoholic intoxication combined with drugs.....	5
Alcoholic intoxication and senectus.....	3
Alcoholic intoxication with visceral and general diseases.....	4
Alcoholic intoxication and trauma.....	3
Drug intoxication.....	5
Visceral and general diseases.....	18
Incident to pregnancy and parturition.....	5
Head trauma.....	4
Epilepsy.....	16
Arteriosclerosis.....	37
Senectus.....	41
Myxedema.....	1
Heredity (combined with other causes).....	66
Psychopathic constitution.....	14
Neuropathic constitution.....	6
Congenital defect.....	16
Indeterminate.....	302
Not insane.....	11
Total.....	691

In the Fourth Annual Report of the Manhattan State Hospital, Ward's Island, New York, it is stated that in 1,546 admissions of insane patients to that hospital for the fiscal year ending September 30, 1908, alcohol was the only discoverable factor in 225 cases, alcohol was associated with other causes in 134 cases, and mental stress, worry, and overwork were factors in 195 cases.

TABLE No. 7.—*Cases of insanity existing prior to enlistment.*

Becoming manifest within fifteen days after enlistment.....	15
Becoming manifest within one month after enlistment.....	29
Becoming manifest within six months after enlistment.....	102
Becoming manifest within one year after enlistment.....	56
Becoming manifest after one year after enlistment.....	72
	<hr/>
	274
Cases occurring "in line of duty".....	103
Cases occurring "not in line of duty".....	151
	<hr/>
Total	528

Table No. 7 is interesting as showing the failure of the present system of enlistment to exclude actually or potentially insane men from the service, and it would seem to suggest not only the desirability of giving some practical form of mental examination to candidates for enlistment, but also of requiring accepted candidates to serve a six months' period of probation in order that their mental status and aptitude for the service and the rating in which they have enlisted may be more definitely ascertained than is possible in the few moments only which can be given them at recruiting stations under the present methods. The determination of the facts shown in Table No. 7 is based upon the official statements of naval medical officers made in reports of medical survey which have accompanied the patients to the hospital.

TABLE No. 8.—*Miscellaneous data.*

Cases giving a definite history of nervous or mental disease in family or collateral relations.....	101
Cases giving a vague history of nervous or mental disease in family or collateral relations	34
Cases giving a history of alcoholism in parents.....	74
Cases bearing stigmata of degeneracy.....	225
Cases giving a history of tuberculosis in family.....	47
Cases exhibiting suicidal or homicidal tendencies.....	68
Cases giving a history of masturbation.....	73
Cases which have been admitted to institutions for the insane more than once	48
Cases which have had an attack of insanity prior to enlistment.....	32

Some of the miscellaneous data in Table No. 8 would seem to indicate the desirability of inquiring somewhat into the family and personal histories of candidates before accepting them for enlistment. Men who have had one or more attacks of insanity prior to enlistment, or who have been in reform schools or penitentiaries, or have been dishonorably discharged from the army; whose families and themselves are alcoholic or tubercular or both; who bear many stig-

mata of degeneracy; who are masturbators or sexual perverts, and who have upon one or more occasions endeavored to commit suicide or homicide, are certainly not desirable candidates for the naval service. Yet from the incomplete hospital records, largely obtained from the insane patients themselves, all these facts were found in the proportions stated in Table No. 8. It should be remembered that many of the patients admitted to the hospital are in such a demented condition that it is impossible to obtain definite information regarding much of their previous life and ancestry, and because of this condition the figures which are given in Table No. 8 are undoubtedly far below the actual facts.

I am well aware that the mental attitude of the man who is anxious to enlist is very different from the mental attitude of that same man when he becomes insane, and many men who would not admit these facts at the time they were enlisted will admit them afterwards. Merely as a matter of curiosity, however, I have frequently asked insane men of the navy from whom bad hereditary and personal histories were obtainable how much time was consumed in their physical and mental examinations by the medical officer who enlisted them, and I have frequently received replies which indicated that the time consumed varied from five to fifteen minutes. Moreover, these same insane men have oftentimes told me, in response to direct questions, that they were never asked if they had ever been inmates of insane asylums or penitentiaries, etc. If the statements of these insane men were true—and I have no reason to doubt them—they would indicate that insufficient care was taken in their enlistment, for obviously very little of the history of anyone can be ascertained in five or fifteen minutes, and no man, sane or insane, is likely to *volunteer* the information contained in Table No. 8. It takes time, tact, and patience to determine such important facts, and the medical officer who makes insufficient effort to secure them, with a view to ascertaining the desirability of a candidate for enlistment, simply neglects his duty. The service oftentimes secures, as the result of such neglect, an utterly worthless recruit who is quite capable of costing the Government two or three times what the four years' enlistment of a desirable man costs, to say nothing of the annoyance of the worthless recruit to other officers in the way of inefficiency, court-martials, surveys, transfers to hospitals, and medical care and treatment.

TABLE NO. 9.—*General paresis.*

Etiological factor.	Number.
Syphilis.....	13
Hardships of war.....	1
Heat prostration.....	2
Meningo-encephalitis.....	1
Abscess of ear.....	1
Heart disease.....	1
Tropical climate.....	1
Traumatism.....	1
Exposure in service.....	1
Cerebral thrombosis.....	1
Eleven years' service in the United States Marine Corps.....	1
Shock of explosion.....	1
Indeterminate.....	1
Total.....	27
Cases of general paresis given "line of duty" in hospital ticket or report of medical survey.....	17
Cases of general paresis <i>not</i> given "line of duty" in hospital ticket or report of medical survey.....	10
Total.....	27

Table No. 9 relates to general paresis, or general paralysis of the insane, of which disease there have been 27 admissions to the Government Hospital for the Insane in my series of 528 cases. It is now practically proven by the laboratory, Wasserman blood serum and cerebro-spinal fluid tests, that syphilis is a necessary factor in the etiology of general paresis. Of 62 cases of general paresis examined by means of the Wasserman serum reaction for syphilis at the Government Hospital for the Insane not a single case was negative (Hough). In Volume VII, page 707, of "Osler's Modern Medicine," we find the following statement:

It is safe to say that the syphilitic origin of general paresis can not be denied. At all events, this infection forms the basis upon which the disease develops. There may be special exciting causes, but without syphilis general paresis does not occur.

This being the fact, it would seem that cases of general paresis should be given "line of duty" only as proof is furnished that the preceding syphilitic infection was received in the line of duty. If cases of general paresis are to be given "line of duty" without this proof, then it would seem but fair that men contracting syphilis should be given "line of duty" also. Of course the absurdity of the latter proposition needs no comment. At the same time it should be remembered that the naval service also has a responsibility in the acquisition of syphilitic and parasyphilitic diseases on the part of its personnel which can not altogether be ignored, though it is very difficult to draw a clear dividing line between the responsibility of

the individual men composing the service and the responsibility of the service to the men.

To be more explicit, we may take as an example a young farmer boy who enlists as coal passer, let us say, at some inland recruiting station. The navy takes him out of an environment in which, it may be assumed, prostitutes are few or unknown, and there is comparatively small danger of his becoming infected with syphilis. Sooner or later in the course of his service he is taken to an environment—perhaps to the Orient—to the fabled land “east of the Suez,” where he is told “there aint no Ten Commandments,” where syphilis is rife, where prostitutes are many, and where the restraining influences of father, mother, sister, and sweetheart are removed. He frequently finds time passing slowly; clean places of amusement are few or absent; he feels an impulse while in Rome to “do as the Romans do,” and the army of prostitutes which frequently follows a fleet like birds of prey exerts an influence amid conditions which in his home community did not exist. The responsibility for the acquisition of syphilis, general paresis, or tabes by that young man may not be entirely his own. The naval service should share in it, I am convinced, though not to the degree of giving him “line of duty” and a pension. That responsibility, too, on the part of the naval service increases according to the degree to which it is able to protect its personnel from syphilitic and parasyphilitic diseases and fails to do so. The greater the opportunity to protect, the greater the responsibility. On a naval vessel the opportunity to protect the health of the men against venereal infection is greater than at a naval station or with troops in the field, because each returning liberty party can be given prophylactic treatment and little or no other opportunity is afforded for the clandestine patronage of prostitutes. If the above responsibility is admitted, the obvious moral is for the service to spare no effort to provide proper recreation for its personnel.

From my examination of the insane men of the Navy and Marine Corps now undergoing treatment at the Government Hospital for the Insane, and the case records of those who have been discharged from the hospital, I have been very much impressed with the great desirability of inquiring into the family and personal histories of candidates for enlistment before accepting them as recruits. I feel sure that if more care were exercised in this respect by recruiting officers that an immense amount of money could be saved the department, as well as extra work for other medical officers, and there would be a great diminution in the number of admissions of insane men of the navy into hospitals for their care. The cruise of the battle-ship fleet around the world in 1908–9 aroused the spirit of adventure in a great many tramps and actually or potentially insane men, who were enlisted in the Navy and Marine Corps. Their mental inferiority

soon became manifest, and one consignment of 19 of such insane men was transferred from the Pacific slope, at great expense, to the Government Hospital for the Insane. A great many of them are in the hospital yet, hopelessly insane, wards of the Federal Government perhaps for the remainder of their lives. An examination into their family and personal histories shows them to be the riff-raff of the country, while mentally many of them are hopeless imbeciles. To be more specific, I give below a very short synopsis of a few histories of insane enlisted men:

Case No. 15015. R. W., private, United States Marine Corps; age 24 years; nativity, Pennsylvania. Admitted to the Government Hospital for the Insane November 4, 1904; discharged, "recovered," August 21, 1905; diagnosis, "manic-depressive insanity;" causes, heredity and intemperance. Patient's father was at the time of the son's enlistment an inmate of an insane asylum, and his paternal grandfather committed suicide. Patient is a sexual pervert, an alcoholic habitue, hysterical, and has had epileptic convulsions. He had been a patient in three different state institutions for the insane prior to enlistment. He has several anatomical stigmata of degeneration. Four months after enlistment a board of medical survey found him insane.

Case No. 18129. J. B., fireman, second class, U. S. Navy; age, 27 years; nativity, New York. Admitted to the Government Hospital for the Insane September 22, 1909; discharged "recovered;" diagnosis, epileptic psychosis; cause, epilepsy. A maternal aunt, uncle, and stepsister died insane, and several of the mother's people died of tuberculosis. Mother's stepbrother committed suicide. Mother has been a patient in an insane asylum. Father is an alcoholic. Patient is alcoholic, has several anatomical stigmata of degeneration, is an accomplished liar, and prior to enlistment was a patient in an insane asylum. Eight months after enlistment, while a general court-martial prisoner, charge desertion, a board of medical survey found him insane.

Case No. 16722. H. McN. (alias H. D.), fireman, U. S. Navy; general court-martial prisoner; age, 35 years; nativity, District of Columbia. Admitted to the Government Hospital for the Insane July 31, 1907; discharged February 5, 1908; diagnosis, "manic-depressive insanity;" cause undetermined. A paternal cousin is insane. Prior to his enlistment in the navy he served a portion of an enlistment in the army under an alias, was found insane, and committed to the Government Hospital for the Insane, where he remained a patient over four years. He was also twice a convict in a penitentiary for assault with intent to kill. He is an alcoholic and a psychic epileptic. Twenty-five days after his enlistment in the navy he was found to be insane by a board of medical survey.

Case No. 16556. W. R. E., apprentice seaman, U. S. Navy; age, 21 years; nativity, Alabama. Admitted to the Government Hospital for the Insane May 13, 1907; discharged "recovered," December 9, 1907; diagnosis, "manic-depressive insanity;" causes, congenital mental deficiency and unaccustomed environment. Patient's uncle had tuberculosis, and his father was an alcoholic. Patient had convulsions when a child, was dull at school, and has numerous anatomical stigmata of degeneration. He was so effeminate in speech, manner, and appearance that his shipmates promptly nicknamed him "Lizzie." Thirteen days after enlistment he was found to be insane by a board of medical survey.

Cases Nos. 17405 and 18164. S. R., ordinary seaman, U. S. Navy, admitted August 14, 1908, and E. R., coal passer, U. S. Navy, admitted October 19, 1909;

brothers; ages, 25 and 24 years, respectively; nativity, Ohio. Both possess anatomical stigmata of degeneracy; both have been typical tramps or "hoboes" and have beat their way on railroads over a good portion of the United States, and both are typical cases of dementia praecox. One brother admits that they are both in the navy under assumed names.

Case No. 18130. C. M. R., coal passer, U. S. Navy, age 24 years; nativity, Kentucky. Father alcoholic; patient alcoholic. Before enlisting in the army he had twice been a patient in an insane asylum. Six months after his enlistment in the army he was admitted to the Government Hospital for the Insane, and was discharged "recovered" seven months later. He then enlisted in the navy, and thirty-one days after his enlistment a board of medical survey found him to be suffering with dementia praecox; cause indeterminate. During his month in the navy he was twice brought to the mast for minor offenses, and was once court-martialed for overstaying his liberty. He has numerous anatomical stigmata of degeneracy.

This list of specimen cases might be lengthened almost indefinitely, but a sufficient number has been given to show the character of a few of the men who have been enlisted in the navy, some of them very recently. They serve to illustrate the failure of the present system of enlistment to detect mental inferiority. The mental disorder of one patient who was admitted to the Government Hospital for the Insane became manifest two days after enlistment. Another patient was enlisted under an alias during a period of hysterical amnesia, and was considered insane three days after his enlistment.

I submit herewith a few photographs of men who successfully passed the prescribed physical examination for enlistment, but who, strange to say, failed to possess the proverbial "sound mind in a sound body," and were therefore admitted to the hospital. It will be noticed that all of them bear anatomical stigmata of degeneracy, the most common of which are asymmetrical faces and craniums, and misplaced or poorly formed ears, while some of them exhibit prognathism or opisthognathism. Two views of some of them are given. Very little or no descriptive text is needed.

Figures 1 and 2 represent a chronic alcoholic habitué.

Figures 3, 4, and 5 are views of the "hobo" brothers above described.

Figures 6 to 11, inclusive, are types of coarse-featured "toughs" whose undesirability for the service should be apparent to any recruiting officer.

Figures 12 to 17, inclusive, are other types of coarse-featured undesirable recruits.

Figures 18 to 60, inclusive, can not very well be classified, but most of them are sufficiently abnormal to attract attention. The majority of them are types of dementia praecox, though many of them would readily pass for imbeciles, and doubtless many alienists would so classify them.

CONCLUSIONS.

1. The insane of the Navy and Marine Corps furnish a much higher recovery rate and a much smaller death rate than do the insane coming from civil life.

2. Not only in justice to the men, but on account of the great expense involved, less haste should be exercised in transferring insane men to the Government Hospital for the Insane, as a good many men manifest no symptoms of mental disorder after their arrival in the institution and are evidently convalescing on arrival.

3. A sound mind does not necessarily go with a sound body.

4. A mental examination for each physically accepted recruit for the Navy and Marine Corps is absolutely essential in order to exclude from the service "dummies," imbeciles, and actually and potentially insane men.

5. The diagnoses "mania" and "melancholia" are no longer tenable, and their use should be discontinued.

6. No case of general paresis should be given "line of duty" unless proof is furnished that the syphilitic infection which necessarily preceded the attack of general paresis was received in the "line of duty."

7. No cases of true paranoia from the Navy or Marine Corps have yet been admitted to the Government Hospital for the Insane. Most of the cases so diagnosed by naval medical officers have been considered "paranoid states" or the paranoid type of dementia praecox by the hospital specialists.

8. Greater caution should be exercised in enlisting men of Irish birth.

9. Of the foreign born, Germans have the best mental make-up.

10. There would be a very much smaller percentage of insanity found to occur among privates in the Marine Corps if the recruiting for that service was performed only by naval medical officers. The medical examination of recruits by civilian physicians, no matter what the professional abilities of those physicians may be, for a military service is not a success, and this practice should be abolished.

11. Alcohol is the chief etiological factor in the causation of naval insanity.

12. Heatstroke and sunstroke act only as exciting causes of insanity in constitutionally inferior individuals who have a predisposition thereto.

In conclusion I desire to express my heartiest thanks to Dr. William A. White, Superintendent of the Government Hospital for the Insane, for the free use of the records and for photographs, and to the members of the staff of the hospital for great assistance in furnishing case histories, without which the preparation of this report would have been impossible.

**NOTES ON THE PRESENCE AND PREVALENCE OF *NECATOR AMERICANUS*
IN SAMOA.**

By Passed Asst. Surg. P. S. ROSSITER, U. S. Navy.

On December 7, 1909, I made a preliminary report upon this subject, reporting the finding of the parasite on November 21, 1909. (Bulletin, Vol. IV, No. 2, Apr., 1910, p. 145.)

Since the demonstration of its presence in Tutuila, work toward eradication of the hookworm has been well underway.

The board appointed by the governor, to consider and report upon this subject, advised in substance as follows:

1. The establishment of a board of health whose orders would have the effect of law.

2. The enactment of a law fixing adequate penalties for disregard of orders or regulations of the board of health.

3. That orders be issued requiring the people of the colony to immediately erect and use the best latrines their ability and resources can produce; that these latrines be at once put under proper inspection; and that, as necessity demands and means and material permit, these temporary structures be replaced with others of approved design.

4. That temporarily the hospital steward of the station ship perform the duties of sanitary inspector, and that the Bureau of Medicine and Surgery be requested to allow this station an additional hospital steward to be permanently assigned to this duty.

5. Estimates were made of the amounts of money required for assisting, where necessary, towns in the construction of latrines and paying for other work under the board of health.

6. Recommendations were made of sources from which these funds could be secured.

The governor approved the recommendations of this board and a board of health has been appointed, to consist of the captain of the yard, the senior medical officer, and the secretary of native affairs. The sum of \$1,000, appropriated from the customs fund, was made available January 1, 1910, and the board of health was ordered to prepare for the consideration of the governor, health regulations, following the recommendations of the "hookworm board," together with such suggestions as they might see fit to make regarding their enforcement.

There are on the islands of Tutuila and Manua 42 coastal and 11 inland villages, with a total population of 6,667.

In order to determine with a fair degree of accuracy what proportion of the native population was infected, 100 persons were selected at random from all parts of Tutuila and Manua as representative of the general population.









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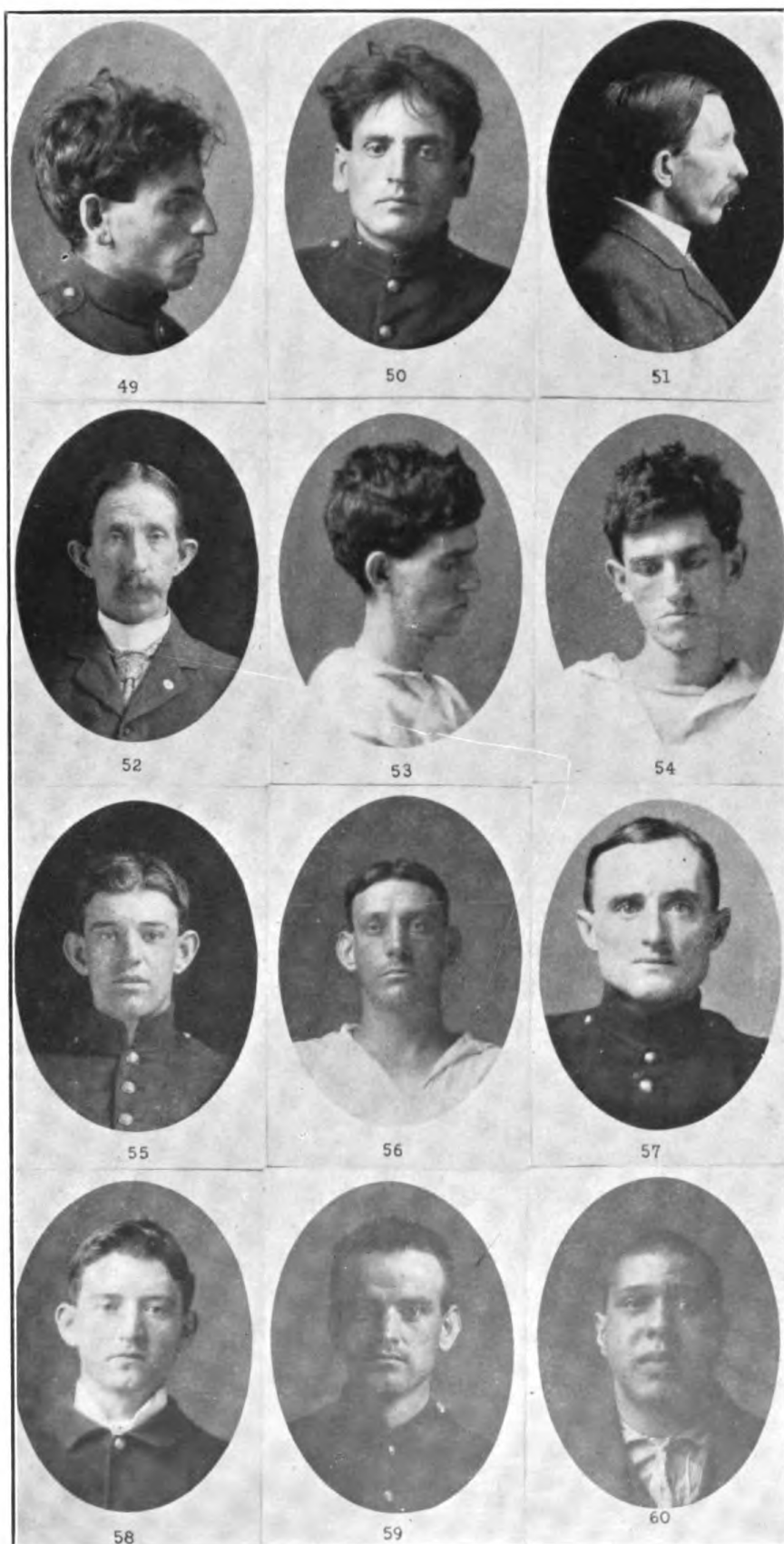
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HOOKWORM IN SAMOANS.

(Family of which every member, except the mother, had a severe infection with *Necator americanus*.)

The stools of these persons were examined for the ova of intestinal parasites with the following positive results:

<i>Necator americanus</i>	51
<i>Trichuris trichiura</i>	84
<i>Ascaris lumbricoides</i>	10
<i>Oxyuris vermicularis</i>	5
<i>Hymenolepis nana</i>	4
<i>Myiasis</i>	2

If this is a correct estimate of the percentage of the population infected with *necator americanus*, and I believe it to be fully that high, uncinariasis presents itself to this community as an important sanitary and economic problem urgently requiring attention. Fortunately circumstances are such that the situation will be promptly and vigorously dealt with, and the problem, we hope, ultimately solved.

When local conditions are considered it is not surprising that this parasite, once introduced, should have invaded such a large proportion of the inhabitants; for the requirements for its propagation and dissemination are ideally met.

The soil is everywhere loose and sandy; the rainfall is heavy and the ground always moist; the temperature ranges between 70° and 95° F. throughout the year. The natives are extremely careless of the disposal of feces, and in general defecate just beside, if not in, the roads, or just outside the houses. A negligible percentage wear shoes, and the native costume, the lava lava, a simple strip of cloth about 30 inches wide and 2 yards long, fastened about the waist, permits every part of the body to come in contact with the contaminated soil, for they sit, eat, and sleep on the ground or on mats.

When and how the parasite was introduced into Samoa we are, as yet, unable to determine other than that Salter, A. G., in the Australian Medical Gazette, states that *Necator americanus*, as well as *Ankylostomum duodenale*, is present in Queensland, and that from the wide distribution and prevalence of the parasite in this island it must have been introduced many years ago.

Many of the infections are found to be very severe, and in one family of eight, a photograph of which is attached, every member but one, the mother, had a severe degree of infection.

Every case examined to date from one of the inland villages has shown a high degree of infection.

Of the Fita Fita guard, who live under far better sanitary conditions than any other natives, 24.4 per cent are infected.

A prominent symptom of uncinariasis as it occurs here, and one which I have not seen mentioned heretofore, is a persistent and distressing cough, which resists the usual treatments for bronchitis until

after the administration of one or two doses of thymol for removal of the uncinaria, when the cough promptly disappears. The only apparent explanation of this symptom, which explanation does not, however, fulfill all requirements, is the irriation caused by the young worms in their passage up the bronchi to reach the esophagus.

Doubtless a large percentage of the cases heretofore treated as chronic gastro-enteritis and attributed to the habitual ingestion of great quantities of poorly cooked vegetable matter were cases of uncinariasis. I recall one patient who died sixteen months ago, her case diagnosed by several competent examiners as miliary tuberculosis, although repeated examinations of sputum had failed to show tubercle bacilli, who, in the light of our present knowledge, I feel sure died of uncinariasis; for every living member of her family has been found infected with uncinaria, and a sister with identical symptoms and a grave infection with *Necator americanus* is rapidly improving under treatment.

The most pronounced cases of perverted appetite so far encountered had a fondness, respectively, for raw rice, starch, soap, and live lizards.

The improvement shown by all cases under treatment is marked, and in some very striking.

One adult male at the time of his first treatment had 4,200,000 red corpuscles per cmm. and 12 per cent hemaglobin. The latter percentage increased in two weeks to 68.

The board of health will have built in every village a sufficient number of public latrines of a type suitable to each locality, and will endeavor by stringent regulations and an active campaign of education to prevent soil pollution. All badly infected areas will be thoroughly cleaned and burned.

An article telling of the presence of the hookworm in the islands, the symptoms produced in those infected, and the measures necessary to prevent infection was published in the December number of the native newspaper, and already numbers of natives are daily presenting themselves and families for examination, and a popular wave of desire to be treated for intestinal parasites is being encouraged.

Since writing the above five cases from Upolo, German Samoa, have been examined, and all have been found to harbor large numbers of *Necator americanus*.

**PROBLEMS OF SANITATION IN LANDING AND EXPEDITIONARY SERVICE
IN TROPICAL AND SUBTROPICAL REGIONS, BY MARINE OBERSTABSARZT
RIEGEL.**

Translation by Pharmacist Paul J. Waldner, U. S. Navy.

[Publications from the department of marine sanitation, issued by the medical department of the Imperial German navy. No. I.]

DUTIES OF THE SANITARY SERVICE IN GENERAL.

In landing forces and expeditionary service in tropical and subtropical regions the task of the sanitarian is to usefully apply the results of the researches in tropical biology, tropical physiology, and tropical pathology to the purposes of military service.

DEFINITIONS.

In contrast with colonial war, landings and expeditionary service deal with shorter undertakings in a limited field, often in emergencies with modest means to pursue local military-political ends.

Landing forces.—These have, under all circumstances, their origin and point of support on shipboard. They are therefore in a sense not self-supporting and are more or less dependent upon ships and ships' supplies.

Expeditions.—Essentially more independent and under certain circumstances thrown entirely on their own resources for considerable periods, expeditions present not only amplifications as regards scope of activity and length of service to landing forces, but also many distinct points of difference. The connection of an expedition to a ship or fleet may be a very loose one, and is in fact not essential to its existence. Thus such a force assumes somewhat the character of a colonial army and the line of differentiation is vague; in fact, the character of one body may merge into that of the other. To add to the difficulty in differentiation it sometimes happens that a body which has in all respects the character and purpose of an army is for political considerations called an "expedition."

Tropical and subtropical regions.—The conception of the terms "tropical" and "subtropical" in the sense here employed deserves explanation. For our purpose a boundary established by biologic considerations is to be preferred to that fixed by the degrees of latitude which regards only the intensity of solar rays. In the following, therefore, tropical and subtropical regions are to be understood as those which lie in the "warm zone," according to the divisions of Supan, in the belt, namely, which is bounded by the annual isotherm of 20°. This warm zone of Supan's practically approximates the polar boundary of the palms. It comprises about half of the earth's surface. Considerations of various mountain ridges and

high plateaus which lie between the Tropics of Cancer and Capricorn or in the thirds adjacent to them—the subtropics—will be omitted. Their climate, though probably differing in individual instances considerably from that of the temperate and frigid zones, can not be considered as tropical in its influence on life processes.

PECULIARITIES OF TROPICAL CLIMATE IN GENERAL.

In general the climate of the warm regions is characterized by the similarity in behavior of its important factors, with the result that meteorological changes take place with a regularity not found elsewhere, and the weather, according to Hann, “is here, like the climate, the average normal course of weather manifestations.” The constancy of the average annual temperature, as compared with that of other climates, may be graphically illustrated. In order to obtain the average annual temperature within 0.1° of exactness it was necessary to consider the observations of sixty years for northeastern Europe, about forty years for middle Europe, and only two years for Batavia, according to Hann. Similar conditions obtain in comparisons of atmospheric pressure and the air currents dependent thereon, as well as the sum and periodical distribution of general precipitation. In these manifestations we find striking regularity and monotony. These peculiarities of tropical climate are of great significance for military undertakings, for the reason that they permit a probable forecast for a considerable period in warm climates with practical certainty. Considering separately the biologically most important factors in warm climates, namely, temperature, sun's rays, surface temperature (temperature of soil), humidity, precipitation, and air currents, the following facts are apparent:

Temperature.—The temperature as compared with the temperate belts is very evenly distributed throughout the year so that there is little difference between the highest and lowest monthly average. At the equator the difference between the average of the warmest and that of the coldest month is between 1° and 5° C. and hardly exceeds these figures at least in the lowlands, even in the interiors of the continents. In the neighborhood of Capricorn and Cancer the annual fluctuation rarely exceeds 13° (Calcutta, 10.3° ; Hongkong, 13.4° ; Habana, 5.8° ; Rio Janeiro, 6.5° ; Khartoum, 12.9°). This even distribution of heat throughout the year has the effect that in many places the daily fluctuation of heat is greater than the yearly. The daily fluctuation in the warm zone lies between 5° and 13° (Equatorville, 8° ; Batavia, 6.5° ; Bakel, 12.4° (Hann)). On the other hand, the elevated deserts and steppes of the subtropics, which, however, lie outside the warm zone of Supan, are characterized by a noteworthy daily fluctuation. Hann states that Rohlf's found in August

and September an average daily fluctuation of 22.2° in the oasis of Kufra (25° N. L., 500 M. above sea level), Livingstone in the interior of South Africa, in June, an average of 26.6° . A difference of 30° to 40° in one day has been observed in such regions as German Southwest Africa (Wiemann). The daily heat fluctuations in the warm regions are hardly higher than the differences between the average highest and lowest annual heat records (Batavia, 12.1° ; Zanzibar, 10° ; Colombo, 12.2° ; Pernambuco, 13.4° (Hann)). To these, in every instance, slight fluctuations may be ascribed the peculiarity and singular effect of tropical climate and not to the highest occurring temperatures which are observable also in southern Europe, it being noted that the average highest temperature in Berlin is 33° (Hann) and that of one of the hottest places on earth—Massaua— 43.2° (Hann), a difference of only a trifle over 10° .

Solar rays.—Of great importance to life processes, and therefore a noteworthy factor in climate, is sunlight. If the number and extent of the measurements which have been made in this direction do not in the slightest substantiate the important effect of sun rays, the fault must be in the imperfections of the instruments which have so far been devised for the purpose. Even the most useful of these instruments, the black-ball thermometer in vacuum with its attachment for regulating the velocity of passing air currents, does not give constant results. In order, therefore, to obtain dependable data regarding the intensity of solar rays in various latitudes, recourse must be had to calculations based on observations and on facts elicited by experience. The basis for the calculations is as follows: Other things being equal, uniformity in permeability of air strata of like density being a prerequisite, the intensity of the rays is dependent upon the size of the angle of incidence, the thickness of the permeated air stratum, and the distance of the earth from the sun—that is, the intensity increases directly with the angle of incidence, is inversely proportionate to the thickness of the permeated stratum, and decreases with the square of the distance of the earth from the sun. The latter factor is the least important, though not entirely a negligible one. As the earth during the south summer is one-thirtieth nearer the sun than during the north summer, it is clear that the solar rays are markedly stronger in the summer of the Southern Hemisphere than they are in the summer of the northern. Consideration of the first two factors—the angle of incidence and the thickness of the air stratum—gives the obvious deduction that the solar radiation is more intense in the Tropics than in other latitudes. As a matter of fact, calculations of the activity (chemical) of direct rays by Bunsen and Roscoe for the time of the vernal equinox, according to Hann, show the following ratios: Melville Island (lat. 75°) 12, Petersburg (lat. 60°) 89, Heidelberg (lat. 49°) 182, Cairo (lat. 30°) 364, Bombay (lat. 19°) 438,

San Jose (lat. 10°) 475, Quito (lat. 0°) 489. These figures, which show an increased activity of solar rays in the Tropics, are corroborated by our daily observations. Aside from the abundant experience in this respect which man has collected in his own body, the photographic plate has demonstrated the powerful activity of the sun rays in the Tropics.

Soil warmth.—In close relationship with the sun rays is the surface warmth of the soil, which, through conduction, but more particularly through radiation, has an important effect on man and his heat regulation. The measurable warmth of the soil is materially influenced by its color and its specific heat, as well as by the angle of incidence of the rays. When these conditions are favorable the heat may rise to a high degree. Regular measurements, made in Chinchoxo on the Loango coast, of sun-exposed surfaces showed a temperature which often exceeded 75° and reached as high as 84.6° . Even with us soil temperature of 50° is not exceptional, and 60° and more has been observed (Rübner). According to v. Foder, Wild has established a soil temperature of 57.1° in July at Nukuss (West Siberia). The deeper strata of the earth are entirely uninfluenced by solar rays. At the proper depth the temperature is a direct expression of the yearly average of the air temperature. At the equator this average is found at the depth of 1 meter as a result of the already mentioned slight fluctuations in the air temperature in that region.

Humidity.—Of the highest significance to heat regulation of man, particularly in the Tropics, is humidity. Its degree may be described according to various conceptions. Of these the one here considered will be that of "relative humidity," because it expresses the degree of moisture in relation to its influence on life manifestation more directly than any other. The relative humidity in the warm regions is much more subject to local and periodical fluctuation than the air temperature. Albeit these fluctuations, which are largely dependent upon the air currents and precipitation, show in the manner of their periodical sequence a close analogy as regards regularity to those of other regions. In general, tropical climate may be designated as moist. On islands and coast regions, as well as in the lowlands extending far into the interiors of the continents, there exists continuously a high and uniform relative humidity. It makes here, in association with the high, slightly fluctuating air temperature, for a condition aptly termed "hot-house air." In Zanzibar and in the Malay archipelago the relative humidity holds at about 80 per cent (Hann), and according to the same authority the annual average for Batavia is 88 per cent; Rio de Janeiro, 79 per cent; San Paulo, 85 per cent; Iquitos, on the Amazon, 83 per cent. In rare instances, where the back country is formed of dry steppes and deserts, or in coast regions, marked fluctuations in relative humidity have been observed as a

result of the influence of changing land and sea winds. For example, on the coast of Senegambia a range from 3 to 65 per cent was observed within three hours. In the higher interiors of the tropical continents greater fluctuations of the relative humidity are found in individual months, almost always directly dependent upon the dry and rainy seasons. For example, in Cuyabo the relative humidity varies in certain months between 50 and 74 per cent and in Moschi on Kilimandjaro between 34 and 80 per cent (Hann). It is constantly low only in the steppes and deserts near the Tropics of Capricorn and Cancer. The oasis of Ghadames, for instance, shows for July only 27 per cent, whereas in the same month in Western Europe the percentage hardly falls below 75 (Hann).

Precipitation.—The total rainfall varies considerably with different regions of the warm zone. While some countries are among the poorest in this respect, others, as compared to our latitudes, have a rainfall which is enormous. Debundscha on the Kamerun Mountain, for which Plehn estimates an average annual rainfall of 700 cm., actually had a rainfall of 897 cm. in 1895, and Techerrapundschi, in the Chassia Mountains, which has an average of 1,253 cm., gave a fall of 2,299 cm. in 1861. In most tropical countries there occurs a more or less clearly defined dry and rainy season. The rain period as a rule occurs with the high altitude of the sun—"summer-rain"—although in such instances the rainy season is not always necessarily the hottest season of the year. Often during the rainy season widespread floods occur in the lowlands. Electric storms, accompanied by heavy downpours, are very frequent in the warm regions.

Air currents.—The air currents in the warm zone are distinguished by their great regularity; particularly noteworthy is the daily regularity on many coasts of the prevailing sea and land winds which may influence the country far into the interior and which have a decisive influence on the climate. Not less important than these local air currents are the trade winds prevailing almost throughout the warm zone and the periodically regular monsoons. Locally the effect of these winds may be very variable, depending on whether they are rising or falling winds, land or sea winds, or whether they are winds from a warm sea to a cooler shore or from a cooler sea to a warmer shore. Generally it may be said that monsoons are rather moist, trade winds, rather dry.

INFLUENCE OF TROPICAL CLIMATE ON THE EUROPEAN.

The, until recently, almost undisputed belief that the climate of the Tropics as usually described is in itself inimical and destructive to man, particularly the European, has of late been considerably modified to the extent which the researches in tropical biology have

been developed. It is now known that, while the climate is enervating, direct disease-producing effect can not be ascribed to it; that this must be looked for in other causative factors, in the wildness and primitiveness of most tropical lands, in the unfavorable general hygienic conditions which give rise to contagious pestilence and develop latent disease, and, in a measure, to the unsuitable and inappropriate life which natives as well as Europeans so largely lead. MacDonald, in his observations in North Australia, has also arrived at these conclusions. While knowledge has thus done pioneer work in dispelling the idea that tropical climate is not directly disease causative in the European, it is nevertheless generally accepted that bodily and mental endurance is lessened even under proper living in most Europeans as well as in those already acclimated. Only a few deny any damaging influence; for instance, Fiebig declares that the acclimated nonalcoholic European can maintain mental and bodily activity and eventually will experience no inhibitory influence from tropical climate. Colonial history shows that under otherwise favorable conditions the health of the European is not endangered by a distinctly tropical climate. Various colonies in the Tropics which had been reputed as deadly to the European developed in time good health conditions. For example, Singapore, which, according to Stephan, cost the life of every second man in its settlement, may now be called a fairly healthy city when measured even by middle European standards. Fiebig states that von Geers has shown by data, covering several decades, collected in the cases of 50,000 officers' wives and 56,000 officers' children in colonial India, that their mortality is lower than that of a similar class in Holland. For officers, in the same estimations, the death rate is higher than in the mother country, proving thereby that it is not so much the climate, as such, which threatens life, but rather certain other factors by which men and soldiers are more affected than are women and children.

Differences between the individual European races conditional on the race.—One is much disposed to ascribe to the blond north European race a lower resistance against tropical climate than to the darker complexioned south European races, such as those of the Mediterranean. Steudel states that Germanic peoples are less readily acclimated than south Europeans, and, according to Plehn, south Europeans showed decidedly greater ability for physical labor on the African coast than north and central Europeans. Regarding resistance to tropical diseases, especially intermittent fever, the behavior of the north Europeans and the Mediterranean races is said to be the same. On the other hand, Woodruff, according to Zur Verth, found that in an American regiment which had been three years in the Philippines the morbidity and mortality was a trifle higher among the blonds than among the dark and mixed races. Obviously

far-reaching conclusions can not be drawn from these meager observations. It is possible that when the south European shows greater endurance in the tropics than the northerner the reason may be found in his general lesser addiction to alcohol. Deeper lying racial peculiarities need not be considered at all. It is not stated how many negroes and negro admixtures were included in the dark and mixed of Woodruff, but it may be assumed from the known composition of the American army that the number was not inconsiderable. Considering the acknowledged fact that the negro is better adapted to tropical climate, the figures of Woodruff could not be used to prove that the blond European and his progeny are inferior to the darker European as regards resistance to tropical climate. Moreover, Wickline, dealing also with the general effect of tropical climate on troops in the Philippines, could find no difference as regards the blond and the dark.

CAUSES FOR THE LESSENERED FUNCTIONAL CAPACITY IN THE EUROPEAN IN THE TROPICS.

The question as to the causes for the lessened capacity for work of the "healthy" European which, for the nonacclimated at least, is considered an established fact demonstrated by daily experience, can not, in the present state of our science, be glibly and conclusively answered. Whether blood changes, like "tropical anæmia," as asserted, even recently, by some (Grawitz, Makoroff) and denied by many (Eijkmann, Grijus, Marestang, Plehn, Glogner), play a part, must be left undecided, but they are in all probability insignificant as compared with the dangers which arise from a direct disturbance of the heat economy of the European in the tropics.

HEAT REGULATION OF THE BODY IN THE TROPICS.

It is established that performance of work does not affect the bodily temperature of the native with the rapidity and to the degree manifested in the European (Plehn). But just how heat regulation is carried on individually in the European as compared with the colored has not been at all clearly established by the comparatively few experiments made in this direction.

Chemical heat regulation.—Chemical heat regulation in any event plays, if any, an insignificant part at the temperature which obtains in the Tropics. This is undisputed. The diminished desire for food, which is not unusual in the new arrival in the Tropics, particularly after physical exertion, is in the healthy a passing manifestation attributable to other causes (excessive ingestion of liquids, changes in blood distribution, unaccustomed diet) than the necessity of the

body to reduce heat production by a reduction of the food supply. Only Ranke comes to the conclusion, after self-experimentation, that in the immigrant European in the Tropics constant undernourishment is the rule. Not only is the capacity for work said to be involuntarily diminished, but simultaneously also involuntary food assimilation is lessened, as determinations of the heat value of foods chosen voluntarily in consideration of air temperature, wind, relative humidity, and sunshine, have shown. Ranke also maintains that inasmuch as the reduction of food assimilation, because of the absence of chemical heat regulation, is not accompanied by diminution in the need for nourishment, a dissension, harmful to the body, arises between heat economy on one hand and muscle economy on the other, resulting in malnutrition and its consequences. Glogner has opposed himself to these assertions of Ranke. He advances the probability that Ranke, before beginning his self-experimentation in the Tropics, was overnourished and not wholly acclimated when he conducted them. Rubner has found that in regard to the total bodily metabolism there is no difference between the colored and white inhabitant of the Tropics. According to the experiments of Eijkmann, the European in the Tropics shows about the same number of heat units as a man of the same body weight and working class in Europe. The heat production of the Malay is no less than that of a European of similar weight (Eijkmann). The same results were obtained by Aron in his investigations in the nourishment of the Filipino. Braum has observed that the hard-working firemen on battle ships eat their entire ration in the tropical waters just as they do in home waters. In relation to the degree of albuminous decomposition Eijkmann could not establish a changing influence in tropical climate. It may therefore be assumed "that when mechanical work is done in considerable amount the demands on the energy supply are the same throughout the world" (Rubner).

Physical heat regulation.—In the regulation of the body heat of man physical regulation undoubtedly plays the major part. Thus the loss of heat by radiation and conduction is lessened more and more with rising atmospheric temperature. At blood heat and higher temperatures radiation is of course entirely lost and conduction (absence of strong air currents presupposed) serves only slightly in this respect. Further than this abstraction of heat is accomplished solely by evaporation of water from the skin. Eijkmann finds that there is no increased heat loss through the lungs in the Tropics, on the contrary while 275 heat units are given off through the lungs in the Temperate Zone this falls to 150 in the Tropics. Rubner also found that in higher temperatures an increase in loss of heat through evaporation is dependent entirely on the skin upon which almost all the work of cooling the body in the Tropics falls.

Importance of relative humidity.—The facility of evaporation from the skin, and consequently the effectiveness of heat regulation in general is extraordinarily dependent upon the relative humidity which therefore assumes a decisive significance. Sensible heat is determined more by the relative humidity than by the atmospheric temperature albeit air currents have some bearing in this connection. Of the importance of relative humidity Rubner and Lewaschew state as follows: "Whether a person be entirely fit, semi-invalid, or invalid the relative humidity is the deciding factor as to the limitation or entire cessation of work." The higher the humidity the more intolerable the heat. Experiment has demonstrated (Rubner and Lewaschew) that with 96 per cent relative humidity a temperature of 24° is intolerable for any length of time and the experiment could only be done with complete muscular relaxation.

Vaporization of moisture through the skin.—Evaporation through the skin occurs by two different methods, the imperceptible vaporization from the capillaries of the skin and more particularly by perspiration. Both methods have their origin in and are accompanied by dilatation and increase in flow of the skin vessels. Only that perspiration which evaporates directly from the skin serves its purpose; that which falls off in drops represents a useless waste of water and energy. The colored seldom sweat in big drops except when they are very fat. In general fat persons are more profoundly affected by physical heat regulation than the lean, and the danger of heat engorgement or accumulation is greater in them. The reasons for these old-established facts have been made clear by the experiments of Von Schattenfroth, who found that at blood heat and with a high relative humidity a lean person can maintain his normal temperature more easily than a fat one because he can, as compared to the latter, increase his loss of water inasmuch as the fat reach their limit of evaporation at a lower temperature. These conditions refer to a state of rest. In a state of activity they make for still more unfavorable conditions for the fat.

Physical heat regulation makes great demands on the body of the European.—Physical heat regulation strongly affects the endurance of skin, heart, blood vessels, and nerves. The daily and hourly battle which the European in the Tropics is forced to wage to maintain his normal temperature places him at a relative disadvantage with the colored races, who, by reason of their admirable suitability to warm climates, are enabled to maintain their temperature without effort. Thus a great part of the energy of the European is expended in internal conflict, and for that reason, though inferior in muscular strength as a rule, the colored races almost invariably outstrip the European in capacity for physical work.

Conclusions deduced.—These conditions are given recognition by all European colonial powers in that they limit their white troops in tropical colonies to those actually necessary and in their stead draw in colored. The white then serve as leaders or as the framework to inspire the others with their willingness, circumspection, and reliability. In expeditions it will not always be practicable to employ colored soldiers, and landing forces will usually consist entirely of Europeans. Then it becomes the duty of the sanitarian to remember the limits which the climate has placed on the physical capacity and endurance of European troops and to urge the employment of colored carriers and baggagemen who can usually be had for money. The white soldier should be brought to the enemy with all possible promptness in order that his superior fighting capacity may be utilized to the fullest purpose. To this end he needs constant care and should be unencumbered on the march.

CAPACITY OF THE EUROPEAN FOR WAR SERVICE IN THE TROPICS.

It is evident that, if military service in a temperate climate requires careful physical selection, the need for closer examination in all particulars is increased for service in expeditionary forces in consideration of the hereinbefore mentioned demands which a tropical climate, and its associated harmful influences, makes on the body of the European. However, Plehn says that "he who is in all respects fit for military service is adapted for tropical service." But this verdict can only apply to serviceability under peace conditions, to officials, to tradesmen, and persons of similar occupation, on whom the demands are materially less than they are on the war-service capacities of the white man in the Tropics. Other nations, such as Holland and England, which must rely upon a paid soldiery, may find a lower standard of requirements for tropical service expedient and sufficient, but, in consequent of the state of our defenses, the love of adventure inherent in our blood and on account of the large number of available men, we are fortunately in a position to eliminate early all unsuitable and doubtful material, and there is no reason for lowering our standard.

Influence of age.—It must be admitted that the age at which our people become eligible for active military service is quite young for tropical service. There is no doubt that the immatured body of the 20-year-old does not so well bear the dangers of the tropical climate as does a fully grown body. Plehn says that for this reason no one should be sent to the Kamerun under the 25th year. According to the investigations of Cantlie the danger in the Tropics to the 18-year-old is ten times greater than obtains for the 30 to 40 year old. Although it would not be proper to apply these figures offhand to our conditions, inasmuch as they are probably the result of observa-

tions made upon persons who went to the Tropics absolutely without a medical examination and in whom the climate made a selection which might have been saved at home, and who, furthermore, probably never had the benefit of intelligent and sensible early training, nevertheless, in connection with our own not entirely fault-free observations, they indicate a lower resistance in the young than is possessed by the old. In southwest Africa as well as in east Africa a distinctly higher admission rate is found for the young as compared with those of longer service, and in this connection it must be remembered that the average difference between our younger and older soldiers is very small. Detailed data regarding the advantages of a higher age for troops in the Tropics are given by Duncas from his experience with the English-Indian forces, who concludes that 25 years is the best age for such service. In any event these conditions deserve consideration in the selection of the people.

Necessity for repeated examination.—Under all circumstances, although one or more examinations as to fitness for tropical service may have been previously made, a careful examination of the landing battalion should be made on board when the force is assembled, in view of the possibility of the development of damaging factors. Such examinations of those detailed for this duty should be made at regular intervals, in order to eliminate and replace those who have suffered impairment of health. As functional capacity can not always be strictly defined on a scientific medical basis, the result of these periodical examinations should be supplemented by actual observations made during the peace practice marches and drills of the battalion if opportunity for such exercises presents itself in the Tropics. Particular attention should be paid in such instances to any who may have recovered between times from febrile diseases, even mild forms, such as tonsillitis, bronchial catarrh, etc.; to heavy smokers, especially cigarette smokers, to which class in the navy, at least latterly, the majority of smokers belong; and to chronic drinkers, who, however, need hardly be looked for in the younger crews. In all these cases damage to the heart must be considered, which may become pronounced under great exertion, though possibly only passive ordinarily.

Special demands.—As already explained, heat regulation in the Tropics affects particularly the heart, blood vessels, skin, and nerves, obviously these organs should be entirely healthy and capable for war service in the tropics. Furthermore, an invariable requirement should be thoroughly healthy special sense apparatus, especially faultless eyes and noses and a perfectly sound motor apparatus. Flat and perspiring feet make for incapacity in this service. As the vicissitudes of landing forces and expeditions often include a disturbance of regular meal hours and the proper preparation of food,

the digestive apparatus is taxed with an insufficiently cooked, monotonous, and unaccustomed diet. Persons subject to stomach and intestinal catarrh are therefore also to be rejected as well as those with bad teeth. On account of the danger of relapse persons who have been infected with syphilis less than two years previously or who have had a relapse within that period or those in whom a distinct serum reaction, in connection with their previous history, indicates a probability of relapse should be rejected. Aside from the difficulties of properly treating syphilis on the march or in camp, this disease predisposes its victims very markedly to sunstroke, according to Hutchinson (Duncan). Unsuitable are, further, all those whose previous history indicates a predisposition to muscular or articular rheumatism. Glogner, on the assumption that certain differences in heat production exist in different individuals, believes that, other things being equal, consideration should be given to the question as to whether the individual is a moderate or heavy eater in the sense that considering body surface and physical work preference would be given the moderate eater over the heavy eater. This requirement, however, for which no substantial foundation exists as yet, would present material difficulties in its application.

Quinine intolerance.—Particular attention and trial should be given to the matter of quinine intolerance. In its milder forms it is such a general manifestation that it can not possibly be considered as an excluding factor. More pronounced forms, as reported by Stendel, Gudden, Ollwig, and Baermann and others which would make war serviceability in malarial countries doubtful are generally rare. In order to detect them, when not already discovered through quinine prophylaxis on board, a quinine trial is indispensable. That fat, anæmic, and debilitated persons are unfit for war service in warm climates needs no reiteration. With conscientious observation and consideration of these points of view in arriving at an opinion of the tropical service adaptability of a European, racial characteristics, such as color of hair, skin, and iris, the body length and length and breadth relation of cranium, may for the present be overlooked as heretofore pointed out.

NECESSITY FOR ALSO EXAMINING THE COLORED FOR WAR SERVICEABILITY.

The colored carriers are also under all circumstances to be subjected to a critical medical examination. The English Aka expedition in which such examinations were omitted, with the result that one-third of the native carriers broke down (Duncan), may well serve as a warning example. A satisfactory performance of work among healthy men whose vocation has been that of carrier should be a presupposition; but it must be borne in mind that in war time when

wages rise, the desire for gain may result in untrained and unsuited men being forced into such service. In view of the widespread prevalence of intermittent fever and helminthiasis among the natives of the Tropics it is not always possible to prevent the employment of carriers who may have the malarial plasmodium in the blood or harbor *Ankylostoma* or *Necator americanus* in the intestine. The danger of the transmission of the diseases to the white troops is lessened just to the extent that these natives are brought promptly under proper treatment, to the care exercised in the segregation of whites and blacks, and to the frequency of changes in camp sites.

PROTECTIVE VACCINATION.

Vaccination against smallpox.—Experience seems to show that the immunity conveyed, which is about ten years in our climate, is rapidly shortened in the Tropics. The reasons are still debatable, but it has been established that in the negroes of the West African coast it has been lost in two years. In view of this it is best to vaccinate the force on the outbound journey, being careful to include all who have not been successfully vaccinated during the previous two years. The experience of the Emin Pascha-Stuhlmann and other expeditions indicate the necessity of vaccinating all colored participants as soon as they join. In all circumstances an effort should be made to vaccinate all subsequent additions of helpers and comers in spite of the difficulties which this may present by reason of the poor keeping qualities of the lymph in the Tropics—Kulz obtained only 50 per cent successful vaccinations from lymph which had arrived in the Tropics six weeks before, albeit the tubes were only sealed at one end with sealing wax—and effort should be made to carry or preserve the lymph, either by wrapping the wooden containers of the tubules thickly with cotton moistened at every opportunity, or by embedding the capillary tubes in potatoes or other potato-like tubers [or bananas]. Dependence can hardly be placed in war time on the scheme of using serum from calves and rabbits which have been infected, a practice which has recently been found successful in the colonies. In expeditions of considerable duration steps should be taken to insure renewed supplies of lymph.

Vaccination against typhoid.—Preventative vaccination against typhoid would usually be indicated only when an advance is contemplated into a region in which an epidemic of this disease is to be expected. The favorable results attained by the prophylactic employment of this type of vaccination, as regards probability of infection, prognosis, rise, and duration of fever and mortality (Eichholz, Smith, Fox, Wright), would seem to justify this protective measure in spite of its known disadvantages. Its protective period is at least two years.

Vaccination against cholera and plague.—What has been said about typhoid applies also to cholera and plague. But a shorter period of immunity should be counted upon—about six months—although vaccination against cholera immunizes more nearly like that against typhoid.

INSTRUCTION OF PARTICIPANTS IN LANDING PARTIES AND EXPEDITIONS IN THE TROPICS ON MATTERS RELATING TO HEALTH.

One of the most important duties of the sanitarian in the Tropics is the education of all concerned in the essentials of the maintenance of health. It is of course not always easy to accomplish all that may be desired in this respect, by means of oral instruction on account of either lack of time or the limited understanding of such matters on the part of those needing instruction. These difficulties would be largely overcome if it were possible to give each man a simply worded and easily understood printed circular of instructions. As the dangers to health in the Tropics are essentially common to all tropical regions generalities would suffice. Special points peculiar to the locality could be brought out by verbal instructions. Such circulars would have special value to small detachments in a scattered command to which no medical officer is assigned. However oral advice should be given at every opportunity. No printed word is as effective as direct and personal instruction from man to man. Carelessness, irresponsibility, and youthful overconfidence which makes light of every precaution against danger can only be successfully combated by personal influence and example.

SELECTION OF SEASON FOR EXPEDITIONS IN THE TROPICS.

Unlike expeditions undertaken for peaceable motives, belligerent expeditions and landing parties must often be undertaken without regard for time and season. If one were free to choose, the tropical lowlands would be avoided during the rainy season with its super-saturated air and increased malarial danger; on the other hand, this season would be best for desert regions, which present the probability of water famine. Exemplary and experienced in this respect are the English, who owe much of their success in the past decades to a judicious selection of the proper time for their projects. The Ashanti expedition, 1873-74, is a well-known example in point.

CLOTHING IN LANDINGS AND EXPEDITIONS IN THE TROPICS.

Clothing, which is one of the means of combating climate, has, in the Tropics, the chief function of mitigating the direct effect on the skin of heat fluctuation, sunshine, air currents, and rain, as well as to protect it from injury. Heat-conserving properties are

hardly necessary. Clothing which offers every requirement of military service in the Tropics has not as yet been devised. Much must be sacrificed to healthfulness in order to secure clothing which is durable, substantial, inconspicuous, and washable—requisites absolutely essential in military clothing.

The particular qualifications of wool, cotton, and linen for tropical clothing are of little moment inasmuch as the superiority which wool possesses over vegetable fiber in this respect is offset by many of its disadvantages. The main consideration is the weave.

Property of absorbing and vaporizing sweat is the determining factor in the choice of material for tropical clothing. Loose fabric would serve best for these purposes, but it finds its limitations in the necessity for the strength required. The reasons for requiring the greatest possible airiness of fabric stand in close relationship with heat regulation by evaporation from the skin. The water vapor delivered by the skin, if it is to have its cooling effect, must be passed off from the clothing with the least possible condensation (Rubner). If the clothes interfere with or prevent the giving off of vapor the relative humidity of the "clothing air" rises rapidly with the result that artificially a climate is produced which, as already indicated, makes proper heat regulation impossible. This fact may be readily demonstrated by wearing a rubber coat, be it ever so light, in a tropical coast region. A most depressing sweltering effect will immediately be observed, due to the interference with heat regulation.

Behavior after wetting.—Next to permeability to air in tropical clothing the most important consideration is its behavior after saturation either with perspiration or rain. Its permeability to air should not suffer materially by being wet. Sometimes this is influenced by a peculiarity of the weft and at times by the elementary material. Woolen flannel and smooth cotton cloth represent the greatest contrasts in this respect. While woolen flannel loses very little of its originally high permeability by being moistened, smooth cotton cloth, in itself lower in permeability, becomes practically air proof. Its effect is like rubber cloth.

Effect of water absorption on heat conductivity.—The behavior of the material toward water is important in another direction. While the elementary material plays only a secondary part in heat conductivity—the larger part of the weave being composed of air, and therefore conducting heat as air does (Rubner)—water absorption gives it significance in this direction. Water may be taken up by most fabrics, either in hygroscopic form or may be inclosed as drops in the meshes. In both ways the capacity for heat conduction is increased, more so by the latter than the former. But in their effect the two methods present potent differences, in that the hygroscopic water, which is not present as sensible moisture, does not in the

least interfere with the permeability to air, while the fluid water inclosed in the meshes may completely arrest it. The facility of heat abstraction under this condition is seriously hindered. In this respect wool is superior to plant fiber. Wool is difficult to wet, so that, as compared with cotton in a similar state of wetness, it loses practically none of its permeability to air; furthermore, it can take up twice as much hygroscopic water as plant fiber (Rubner), thereby increasing its capacity for heat conduction by 109.8 per cent, while that of cotton increases only 16 per cent (Rubner). By reason of the intimate relationship which exists between relative humidity and capacity for heat conduction on one hand, and relative humidity and inhibition of heat abstraction on the other, this property of wool becomes important in that it meets most admirably the bodily needs. Further differences among fabrics are found in the nature of their surfaces. Smooth cloths, when wet, stick much more unpleasantly to the skin than rough. Wool is again superior in this respect, being more difficult to wet, in the first place, and when wet even to saturation its nap prevents sticking to the skin.

Thickness of tropical clothing.—Rubner declares 1.76 mm. to be the proper thickness of midsummer clothing. For tropical clothing the same requirement should hold. However, the demand for durability and strength for war serviceability makes it necessary to overstep this value in spite of the very apparent disadvantages. The total thickness should be divided into two layers—outer and under clothing. This has the advantage that when circumstances permit a part of the body covering may be removed for relief, although it must not be forgotten that the outer clothing offers a very material protection against sunlight, insect bites, and other injuries.

Materials for underwear.—Smooth fabrics, for reasons already given, are entirely unsuited for tropical underwear. The material best adapted to the purpose is that which is loose, easily washable, and difficult to wet, with high permeability, having good heat conductivity and sufficient strength. Some of these requirements are well met by wool-flannel, but its thickness, 2 to 3 mm., with its consequent high heat conservation, its poor lasting quality, and the fact that it washes poorly, constitute objections. Through insufficient washing it loses practically all of its original advantages. Wool-tricot, ordinarily very serviceable, is also pretty thick and consequently warm, not very durable, and difficult to wash. Cottontricot is more than 1 mm. thick, very changeable, in that its interstices widen considerably through wear, but washes easily. Linen-tricot, which meets the requirements for thickness and washableness, is hard and therefore rubs.

Mixed fabrics.—Under these conditions it became desirable to attempt the production of a fabric adapted for tropical underwear

by a mixture of the elementary materials, wool, cotton, and linen, which, like the mixtures of certain metals, would combine the good points of the component elements without their disadvantages. And in this way, with suitable weaving, very serviceable cloth has been made. Reform cotton and the material "Superior" and others are fabrics of this kind. Zur Verth, in East Africa, was well satisfied with a linen-hemp or linen-cotton combination, which, however, failed to take advantage of the many good points possessed by wool. In general it may be said that the problem of producing a suitable fabric for tropical underwear, by appropriate mixtures, has been solved.

Materials for outer clothing.—The same can not be said as regards outer clothing. In this instance the demand for good permeability is opposed by the need for durability and strength, which can only be furnished by smooth strong-fibered material. Therefore the much desired quality of permeability-to-air-when-wet must, for the present, be sacrificed to serviceability for war purposes in other respects; moreover, the protection from sunlight, which the outer clothing must give the skin, necessitates a density which is incompatible with easy permeability.

Color of materials.—Of much more significance in this connection is the color of clothing. Experiment, largely substantiated by experience, has shown that white is the best color for outer garments in the Tropics, because it very completely reflects the light rays and thereby protects the skin from their effect. Light yellow stands close to white, whereas the darker yellow of khaki is much less effective in this respect. Military reasons of great weight, however, render the use of white and light yellow impracticable. A material, described by von Sambon, woven of yellow, blue, and red threads, gave considerable promise as regards exclusion of the chemical rays which are largely responsible for skin burn and sunstroke. Strength and good permeability was also claimed for this fabric, but it has not fulfilled expectations, inasmuch as it fades rapidly. "Assolar," made by Dingeldey & Werres, seems, according to the descriptions, to be a similar fabric.

Waterproof stuffs.—The efforts to render the outer garments waterproof by appropriate treatment, even though permeability to air has been maintained, have not been very successful with the means so far known without destroying that most essential requisite of tropical clothing—absorbability of sweat.

With the body in a state of rest a rubber blanket or other similar protection against rain may be used without serious interference of heat regulation.

Abdominal binders.—The abdominal binder, for ages a part of tropical clothing, serves in contrast with the other garments, par-

ticularly as a heat conserver. As the binder must for this reason necessarily be thicker than the underwear, it may be made of woolen or cotton flannel. Under constant use it soon loses its virtue, for the reason that it develops a local sensitiveness of the belly. It should therefore be worn only when a comparatively marked fluctuation in temperature threatens abdominal troubles, and then only at night.

Necessity for changing clothes after a march.—Inasmuch as after every march the underwear, as well as the outer clothing, is usually thoroughly wet, reasons of health indicate that each man should be able to completely change his clothes for the night. The clothes worn during the day should be washed or at least dried. Such a change of clothes, combined with a dry rub of the body, will be found refreshing. To permit the men to sleep in moist marching clothes is extremely detrimental to health, in that it induces a rapid and marked cooling of the body, particularly if the clothing is made up of smoothly woven fabric, just at the time when the body needs it least—namely, when in a state of rest. This is easy to understand in view of the fact that if the clothes contained only 700 grammes of water it would require for its vaporization one-third of the heat units which a grown person in a state of rest can develop in one day.

Leg and foot covering.—The covering of the foot and leg in the Tropics deserves careful consideration, even from the standpoint of health. Primarily the purpose is to protect these parts against injury of every sort. How very necessary this is is shown by the frightful condition of the feet and legs of carriers who have completed an extended march and the frequency of the occurrence of “climatic” buboes, invariably the result of foot and leg injuries. Especially to be dreaded in the Tropics are the incised wounds produced by certain rushes and grasses, which by reason of the silicic acid deposited in them are practically knife-edged in effect, and the lacerations and punctures of thorns; of less significance, but nevertheless troublesome, are the prickly seeds of certain steppe grasses, which embed themselves under the skin and produce local inflammation and at times lymphangitis. A very material danger, on account of intermittent fever, are the bites of insects, usually found about the ankles. Protection against sand flies, scorpions, snakes, thousand-legs, and land leeches is also to be considered.

Shoes.—Shoes should be of strong leather, which, in consequence of its being a poor conductor, protects the foot from the heat of the soil, and the thicker the sole the better. The color is, in this connection, of little moment because, as regards their conduction of colors, the dark heat rays concerned here do not obey the same laws as light rays (Rubner). However, the color is of significance in connection with protection from the light rays from the sun. For this reason

black shoes are not adapted to the Tropics. Burn-blisters have been attributed to their use (Braune). The fawn-yellow of uncolored leather is well suited to the purpose. In addition to the marching shoe a comfortable leather or canvas shoe is a necessity to rest the feet in camp, and as it is worn at a time of day when mosquitoes bite most freely it should also cover the ankle.

Leg covering.—The manner of giving the leg the necessary protection is immaterial from a standpoint of health, the decisive advantages and disadvantages among the various types of leggings, etc., lie more in other directions than in that of health. Leather, because of its compactness, offers the surest protection against injury, but is inferior to woven stuffs in permeability to air albeit in dry, unoled leather this is not so poor as it would seem—even sole leather encloses 42 per cent of air (Rubner). Sufficiently protective and otherwise well adapted to the purpose are the (by Zur Verth highly praised) winding puttees worn by the colored soldiers in German east Africa.

Stockings.—The requirements which apply to underwear apply also to hosiery. But it must be remembered that in order to spare the feet as much as possible greater thickness is required to give the foot the necessary padding.

Head covering.—The already mentioned extraordinary power of sunlight in the Tropics and its especial richness in chemical rays, particularly in the midday hours when the sun is high, demands an effective protection for the head of the European, whose brain is markedly sensitive to these rays. This is found in the better kinds of cork or pith helmet, which can hardly be improved upon as a protection against the effects of the sun. Its faults lie in other directions. As regards its color the same holds true as has been said of outer clothing. During the morning and evening hours, when the sun in the Tropics is also relatively poor in short-waved rays, a light cap such as is used by us [the Germans] in summer is sufficient.

To follow in the next number of the BULLETIN :

Equipment of the individual (burdening the man, equipment for night camp, equipment for skin treatment, cooking utensils). The march (sick call before and after, duration of march, time, night marches, order of march, pauses, drinking on the march, diet, etc.).

Camps (necessity for medical cooperation in selection of site, unsuitability of human habitations, requirements of a camp site, source of water, latrines, washing places, separate camp for the colored, etc.).

Drinking water (sensitiveness of the body to deprivation of water, surface water, preparation of water for use, etc.).

Alcohol—Feeding the troops.

Special diseases—Arrangements of the sanitary service.

Sanitary equipment—Dressings and medicines.

U. S. NAVAL MEDICAL SCHOOL LABORATORIES.

HELMINTHOLOGICAL TECHNIQUE.

2. METHODS FOR THE STUDY OF PARASITIC WORMS AND THEIR OVA.^a

By Passed Asst. Surg. P. E. GARRISON, U. S. Navy.

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As recognized in the introduction to the first part of the present paper, the individual worker may frequently desire to study his material before placing it in a collection, either for the purpose of clinical diagnosis or as a matter of personal scientific interest. As the usual pathological procedures familiar to medical men in preparing tissues for study differ in many essential points from the methods best adapted for the study of worms and as special helminthological methods are not commonly given in text-books and are not generally available, it is proposed to bring together in as concise a form as possible the recognized laboratory methods in most general use in helminthological work. It is not within the purpose of such a paper to critically examine the relative advantages of or even to cite the numerous methods recommended for the same purpose, but simply to give a brief description of the comparatively few and simple standard technical procedures necessary to be used in the study of parasitic worms with a view to their determination.

^a Part 1. "Methods for the Collection, Killing, Preservation, and Mailing of Parasitic Worms and their Ova," published in Bulletin, Vol. IV, No. 3.

EXAMINATION OF FRESH MATERIAL.

The examination of a specimen naturally begins during its collection, when we may note its general form and size, its natural color, its activity, its exact situation, and method of attachment, together with any gross pathologic conditions attending the infection.

After the specimen has been transferred to the warm saline solution, and before it is killed, it is highly desirable that it be studied as carefully as possible, since a number of facts can be determined while the worm is still fresh, which often can not be made out after its preservation without stained sections, and, in fact, certain points may come out more clearly in fresh material than they can ever be brought out by any manipulation after the specimen is killed.

In this preliminary examination of the fresh specimen, the following points are of special interest:

MEASUREMENT.

If the worm is not too active, more accurate measurements of the gross dimensions can be made in the fresh condition than after it is killed and preserved, since these processes are apt to cause some shrinkage and perhaps distortion, especially if they are not carefully done. This applies especially to flukes and tapeworms. In measuring the length of tapeworms they should be laid out on a wet, flat surface and not held up by one end, as such suspension stretches them abnormally. Very small specimens had better be measured by calipers, or, if calipers are not available, they may be laid out directly upon the scale of a ruler.

EXTERNAL ANATOMY.

A number of points concerning the general form and structure of the body and its appendages may be gained as well, and in some cases better, from the fresh specimen than from the stained and mounted preparations. This is especially the case if the worm be still alive and moving. The true structure and relations of suckers, pores, hooks, lips, and markings of the skin, the action of certain groups of muscles, the presence and number of papillæ are some of the points which may often be determined to advantage from fresh material under the hand lens or microscope.

INTERNAL ANATOMY.

As practically all worms are more or less transparent in the fresh state, it is sometimes possible to make a fairly complete study of their internal anatomy and to determine some points which can be made out only with great difficulty, if at all, after their tissues are

coagulated by preservation. To study the inner structures, the worm should be placed (in the salt solution) between two slides, or, if small, beneath a cover glass. By holding the specimen up to the light the larger organs of flukes and tapeworms may be made out with the naked eye. With the hand lens and microscope, it is frequently possible to obtain a very satisfactory picture of size, position, and relations of the inner organs, and one which is more enlightening in some respects than can be gained from mounted specimens. In connection with this examination there are certain manipulations which are of advantage either in bringing out the general anatomy or in the study of special structures.

In the case of cestodes, the examination is furthered by applying a certain amount of *compression* and by *turning* the specimen over so as to examine from both surfaces. The roundworms may be *rolled* over by gently sliding the upper slide or cover glass, a procedure which is easier to accomplish while the worm is fresh than afterwards.

The addition of a drop or two of *caustic potash* solution (about 30 per cent) allowed to run under the slide "clears" the superficial layers and allows the inner structures to be seen more plainly. This is particularly useful for nematodes. It is rarely of advantage for cestodes and flukes. The fresh specimen may also be cleared by allowing *glycerine* to run very gradually under the slide. The application of caustic potash and of glycerine will be further considered in the examination of preserved material, where they have their great usefulness, but we have found them of occasional value in the preliminary study of fresh specimens.

Maceration, *teasing*, *dissection*, and *digestion* are other methods applicable to the study of fresh as well as of preserved specimens.

Maceration is effective for flukes and the larger segments of tapeworms. It is not applicable to roundworms. The specimens are simply allowed to lie in water for from several hours to several days, when they become partly disintegrated, especially the outer walls, leaving the inner structures intact, so that they may frequently be seen very clearly.

The most common purpose for which worms are *teased out* with a needle point is to obtain the eggs. This may sometimes be done to advantage after maceration.

Dissection is very rarely applicable to tapeworms or flukes, but is useful in studying the larger nematodes, such as *Ascaris* and *Echinorhynchus*.

Digestion by artificial gastric juice is sometimes a valuable method of obtaining, free from parenchymatous tissue, such small structures as eggs or egg balls (*Davainea*), or in setting free the cysts or embryos embedded in muscle (e. g., *Trichinella*).

A word should be added concerning the *examination of fresh ova*. As mentioned in the part on preservation, there is no method for the preservation of ova which is entirely satisfactory in all cases, and it is therefore desirable to study the eggs of parasites as far as possible in the fresh state. Whether they are taken from the worms themselves or are found in the feces, sputum, or urine, they, as a rule, lend themselves to examination more satisfactorily while fresh. If in the feces or sputum, they may be first washed and sedimented as described for their collection, and then a drop of the sediment dropped on the slide from a pipette, covered, and examined first with low and then higher power lenses. In examining ova with rather thick and highly colored shells a little caustic potash solution run under the cover is a distinct help.

EXAMINATION OF PRESERVED MATERIAL.

After the tissues have been coagulated in the process of killing, it is necessary to employ special procedures in order to see and study their anatomical characters, and the methods used may be considered under three heads, namely, clearing, staining, and mounting *in toto* and sections.

In the nature of the case, clearing methods are applicable chiefly to the roundworms and to ova, and staining and sectioning, while coming more and more to be used in the study of nematodes, still find their chief usefulness in working with tapeworms and flukes. Stains are rarely if ever used for roundworms except when they are sectioned. This radical difference in technique is for the most part due to two facts. In the first place, the classification of the nematodes has been based largely upon the characters of their chitinous cuticle and its appendages, while in the flatworms, in the absence of these external characters, the classification considers to a much greater extent the characters of the inner organs. Hence, in order to determine the systematic position of roundworms, we, as a rule, need to examine the external chitinous skin, its apertures, and the structures attached to it, while in dealing with trematodes and cestodes we must study the deeper structures, which can be brought out in detail only by staining and perhaps sectioning. In the second place, because of their impermeable skin, roundworms do not lend themselves well to staining unless sectioned, it being practically impossible to secure satisfactory penetration of the staining, decolorizing, and dehydrating fluids through the chitinous cuticle.

In general, therefore, in considering clearing methods, we are dealing particularly with roundworms and ova, while under staining and sectioning tapeworms and flukes are the groups chiefly concerned.

Such special procedures as *maceration*, *teasing*, *dissection*, and *digestion*, which have been mentioned in discussing the examination of fresh specimens, are applicable as well to the study of preserved material and need not be considered further under this head.

CLEARING METHODS.

(Without staining. Chiefly for roundworms and ova.)

Caustic potash (or caustic soda) in a strong solution of 30 to 50 per cent is one of the two most valuable and most used reagents in the study of roundworms and of thick-shelled eggs. The action of the potassium on the chitin of the cuticle or shell renders it clear and transparent so as to reveal not only its own structure and appendages (striations, pores, papillæ, lips, hooks, spines, etc.), but also the deep structures lying within. If the caustic acts too long, the chitin becomes excessively swollen and distorted. For this reason it is preferable in nearly all cases to watch the action under the microscope, allowing a drop or two to run under the cover glass. When the chitin is sufficiently cleared the caustic may be weakened or removed by allowing fresh alcohol (or glycerin, see below) to run under one side of the cover, drawing it off with blotting paper or pipette at the other side.

Glycerin has a marked clearing effect upon the chitin of roundworms and ova and also upon cestode and trematode tissue, though its use for the flatworms is more limited. In applying glycerin it is essential that the material pass very gradually from the preserving alcohol to the pure glycerin, and the best method of effecting the transfer is to allow the alcohol to slowly evaporate from a mixture of alcohol and glycerin containing the specimen. The 70 per cent alcohol to 5 per cent glycerin preserving fluid, mentioned in Part I of the present paper, is particularly adapted to this procedure, as by simply removing the cork from the bottle the alcohol will slowly evaporate, leaving the specimen in pure glycerin, or glycerin plus a little water, the water evaporating in turn if allowed to stand. If the specimen be at all bulky, more glycerin should be added to the alcohol when the evaporation is started—enough to cover the specimen. The specimen and alcohol may be placed in an open dish to hasten the evaporation, but it is not advisable to warm it above room temperature. The vessel should be carefully protected from dust and dirt during evaporation.

When it is not convenient to wait for the evaporation of a considerable bulk of alcohol, or where the specimen is already on the slide under the microscope, it is possible to effect a more rapid clearing with glycerin by allowing pure glycerin to run under one side of the cover, not too rapidly, when it first gradually mixes with the alcohol

(or salt solution, in the case of fresh specimens) and finally replaces it. Carelessness in allowing the glycerin to envelope the worm too rapidly will invariably result in a badly shrunken specimen.

Perhaps the most valuable procedure in clearing round worms for study is the combined use of *potassium hydrate and glycerin*, giving the specimen a preliminary treatment with the caustic and then gradually transferring it to glycerin, as above described. In addition to clearing the chitin, both the caustic potash and the glycerin tend to make the worm soft and pliable so that it can be rolled and turned beneath the cover glass, and the success of the examination depends in a large measure upon the skill of the examiner in these manipulations.

Permanent mounts of glycerin preparations.—As described above, the caustic potash and glycerin methods of clearing serve only to prepare the specimen for study without a view to permanently mounting it on a slide. This latter procedure is sometimes desirable and may be accomplished by either of two methods. The simplest is, after securing the specimen in pure glycerin, to merely ring the cover glass heavily with cement or balsam. Such preparations are permanent so long as carefully handled and kept horizontal. They are not suitable for mailing, however, and if placed upright the specimen is apt to settle to one side or the glycerin to leak out. The second and preferable method is to transfer the specimen to *glycerin jelly*. The formula for Kaiser's glycerin jelly is as follows (Lee's Vade Mecum, 6th ed., pp. 116-117):

Kaiser's glycerin jelly.—One part by weight of the finest French gelatin is left for about two hours in 6 parts of water; 7 parts by weight of glycerin are added; and for every 100 grams of the mixture, 1 gram of concentrated carbolic acid. The whole is warmed for from ten to fifteen minutes, stirring all the while until all the flakes produced by the carbolic acid have disappeared. Filter while warm through the finest spun glass which has previously been washed in water and laid in the funnel while wet.

By frequently warming with a flame we have succeeded in filtering through ordinary filter paper. In the Tropics a little more gelatin should be used. The addition of a little formalin just before mounting increases the hardness of the gelatin after it has set.

The warm gelatin may be placed directly on the specimen on the slide and quickly covered with the cover glass pressed down on the specimen or, preferably, the worms may be transferred from glycerin to a dish of warm gelatin for five or ten minutes and then mounted. Enough gelatin should be used on the slide to just fill the cover glass when it is lightly pressed down on the specimen. Excess of gelatin interferes with the subsequent ringing. They should then be ringed with cement or balsam, and the result is a fairly durable preparation, especially in moderate climates.

This glycerin-jelly method of mounting is applicable to ova as well as roundworms. The eggs should be secured in as small amount of glycerin as possible, especial care being taken that the transfer from alcohol to glycerin be very gradual. The glycerin containing the eggs is then mixed with about an equal quantity of warm jelly, mounted, and ringed. As it is necessary to carry over with the eggs to the jelly some quantity of glycerin, the proportion of glycerin in the jelly is increased and the preparation does not get so hard; yet to add a greater amount of the jelly results in too great a dilution of the ova. Where the jelly was being made especially for eggs we have found it an advantage to reduce the amount of glycerin by half, thereby obtaining a harder preparation.

STAINING AND MOUNTING IN TOTO.

(Chiefly for flukes and tapeworms.)

The purpose in staining in determinative work in helminthology is to locate and differentiate clearly the various organs of the worm and not, as it is in pathological work, to bring out the cellular structure. The technique is correspondingly different. The selective chromatin stains are not indicated, but we used instead the so-called general stains, depending largely for our differentiation partly upon the greater tenacity with which certain organs seem to hold these stains and in part upon drawing out the stain from the superficial tissues, leaving the deeper structures deeply colored. In short, the technique is to stain the whole specimen deeply and then to carefully decolorize the surface layers, leaving the inner organs stained.

Staining.—The carmine stains are those most used in helminthological work for general determinative purposes, and of the many carmine stains described there are two which are so simple in their preparation and operation and fulfill so satisfactorily all the requirements for the general run of work that we will not occupy space to describe others, referring the reader to works on laboratory methods, especially the last edition (sixth) of Lee's "The Microtomist's Vade Mecum."

Of the stains in question, one, Mayer's hydrochloric acid carmine, is strongly alcoholic, while the other, Mayer's carmalum, is aqueous.

Mayer's alcoholic HCl carmine (Lee's Vade-Mecum, 6th ed., p. 175):

Carmine	grams	4
Water	c. c.	15
HCl	gtts	30

Boil until the carmine is dissolved, add 95 c. c. of 85 per cent alcohol, and neutralize by adding ammonia until the carmine begins to precipitate.

If it be desired to dilute the solution it should be done with alcohol, not water, and alcohol of 80 to 90 per cent should be used for washing out.

It is seen that the stain is strongly alcoholic (about 80 per cent), and on that account has these advantages that specimens preserved in 70 per cent alcohol can be transferred directly to the stain and paraffin sections do not need to be carried down through the weaker solutions of alcohol for staining as they do when an aqueous stain is used.

This carmine is a powerful stain, coloring the entire specimen a rich, dark red, and while it is a "general" stain it is possible by careful decolorization to obtain a striking differentiation of the genital glands, the latter frequently appearing to have a greater affinity for the stain than the surrounding tissue and retaining the stain after the other tissues have been almost wholly decolorized. Moreover, we have frequently noticed in working with trematodes that the ovary, testicles, and vitellogen gland may take on quite a different tint from each other and from the other tissues, the vitellaria being a yellowish brick red, the testicles a pronounced violet, and the ovary a violet of a considerably darker shade than the testicles.

Occasions arise when an aqueous rather than an alcoholic stain is desired, and one which gives good results is Mayer's carmalum, for which Lee (6th ed., p. 167) gives the following receipt:

Carmine acid.....	gram--	1
Alum	grams--	10
Distilled water.....	c. c.	200

Dissolve, with heat if necessary, and add some antiseptic, either a few crystals of thymol, 0.1 per cent of salicylic acid, or 0.5 per cent of salicylate of soda.

Specimens may be transferred to this aqueous stain from 50 per cent alcohol, though it is better to first run them down a little lower, say 25 to 30 per cent.

These two carmine stains are very penetrating, and as they are used in helminthological work there is no danger of overstaining, the specimens being left in the stain a number of hours overnight or even several days. As a rule, the best differentiation seems to be secured in the larger flukes and tapeworms in specimens which have been stained from fifteen to twenty-four hours. With smaller worms one to two hours is sufficient.

The carmine stains are ready for use as soon as prepared, keep indefinitely, and the color of stained specimens does not fade.

With some material, such as old or badly preserved specimens, the tissue does not take the carmine well and better results will be obtained if hæmatoxylin be substituted, but such cases are rare. With hæmatoxylin overstaining must be carefully guarded against.

Decolorization.—In some cases sufficient abstraction of the stain from the superficial tissue can be secured with alcohol alone, using about 90 per cent alcohol if the alcohol carmine has been used and

about 30 per cent alcohol if stained with aqueous carmine, in the latter case the excess of stain having been first washed off in distilled water. In the great majority of instances, however, it is necessary to acidulate the alcohol, and this is usually done with a few drops of hydrochloric acid, though acetic acid is sometimes used. The exact amount of acid required is largely a matter of experiment. It should be strong enough to act promptly upon the surface layers, abstracting most of the stain from them by the time it has penetrated the deeper structures. We usually begin by adding about three drops of strong hydrochloric acid to about 50 c. c. of alcohol; if this does not prove sufficient, more alcohol is added. The progress of the decolorization needs to be carefully watched, preferably by frequently placing the specimen under the microscope. To check the decolorization promptly the specimen may be transferred to alcohol made slightly alkaline with ammonia, though with experience it is usually necessary to simply transfer it to nonacidulated alcohol.

Counter staining.—Picric acid is the counter stain most commonly used with carmine, but it is questionable whether counter staining is of any real advantage in the ordinary anatomical study of worms, especially when they are mounted *in toto*. For sections it may possibly secure a better differentiation in some cases, but, as a rule, even here the straight carmine stain with careful decolorization will probably give better results.

If counter staining be desired, the simplest method is to slightly color one of the dehydrating alcohols with a few picric-acid crystals.

Dehydrating, clearing, and mounting.—Scarcely any different technique is required for these processes in dealing with flat worms from that commonly used for pathologic and other tissues. The specimen is passed through gradually increasing strengths of alcohol, usually 30, 50, 70, 85, 95, and 100 per cent. (If the alcoholic stain is used the four lower strengths are not needed.) The different clearing fluids may be used, but xylol is entirely satisfactory. Instead of using absolute alcohol, which it is difficult to keep up to strength, 5 per cent carbolic acid may be added to the xylol, and the specimens may be passed directly to the carbo-xylol from a weaker grade of alcohol, even as low as 95 per cent.

One precaution is necessary with flukes and tapeworms, namely, to see that the specimens are *properly straightened out and flattened* before they become hardened in the higher strength alcohols. This may be accomplished by pressing them between two glass slides held by one or two rubber bands. In this condition they may be stained and passed through the dehydrating and clearing fluids. The amount of compression needed varies, of course, according to the size and form of the parasite. Decolorization should be done with the worms free in the acid alcohol without the glass slides so that the fluid can act on the surfaces.

SECTIONS.

To determine the relative positions of different organs of cestodes and trematodes in different planes and to study their finer structures sections are necessary, and these are usually required in three planes, longitudinal, transverse, and sagittal (parallel with the ventral and dorsal surfaces). Since, as a rule, we wish to study the organs and the grosser structures of the worm and not its cellular structure, thin sections such as are generally used in histological work are seldom required. The helminthologist usually uses sections from 25 to 500 microns thick or even thicker, as, for instance, where it is desired to merely shave off the superficial tissue so that the deep structures will be brought plainly to view.

Specimens of *flukes* and *tapeworms* may be stained in bulk before sectioning, just as for mounting *in toto*, and this is probably the usual procedure. In most cases the results are quite satisfactory and there is a great saving of time and handling.

Paraffin is almost universally used for embedding, and the technique does not vary materially from that ordinarily used in pathological work. It is essential, however, that the specimen be carefully oriented in the paraffin block in order that the sections may be made exactly in the desired plane.

Sections of *roundworms* are sometimes required, especially of late years, when more attention has been paid to the form and structure of the internal organs as accessory characters in the determination of systematic groups.

Owing to the long, slender, cylindrical form of the worms only transverse sections are needed, or, in fact, practical.

Because of the impermeability of their skin, roundworms must be stained after sectioning. This may be easily done on the slide by dissolving out the paraffin in xylol, transferring to absolute and then to 95 per cent alcohol, and then directly to the alcoholic carmine stain.

The great difficulty in sectioning nematodes lies in their tough chitinous cuticle, which not only prevents the free penetration of the embedding material, but is also apt to tear before the microtome knife instead of being squarely cut off. The first difficulty can usually be overcome satisfactorily by cutting the worm into pieces of greater or lesser length, according to its size, so that the embedding fluid may penetrate from the open ends of the chitinous tube.

The tearing of the cuticle may be avoided by using a hard paraffin, securing thorough impregnation, or by special embedding methods.

While it sometimes seems necessary to resort to the special methods, we have usually found it possible to get satisfactory sections by straight paraffin embedding, using a hard paraffin, getting the tissue thoroughly impregnated, having a keen knife, and not trying to

cut the sections too thin. Some workers claim that the paraffin method carefully worked out will always give as satisfactory results as any of the special celloidin, combined celloidin-paraffin, or other processes.

In helminthological work, where thick sections are wanted, and especially in cutting nematodes and arthropods, it is sometimes a distinct advantage to use a "hand" microtome on which the knife can be given an oblique gliding motion, such as is given a razor in shaving, instead of being carried as a wedge straight through the tissue, as in the mechanical instruments.

SUMMARY.

Below are brought together the essential steps in the collecting, killing, preserving, clearing, staining, mounting, and sectioning of flatworms, roundworms, and ova, respectively, as described in the foregoing papers. Where not separately indicated, the same procedure is to be used in all cases.

COLLECTING.

Wash in warm water or, preferably, salt solution; in case of ova wash thoroughly by repeated sedimentations in water.

KILLING.

Flatworms.—Kill in following solution: Saturated aqueous solution of bichloride of mercury, 70 per cent alcohol, equal parts; mix, and add 1 per cent glacial acetic acid; use heated to about 70° C.; wash in running water; remove residue of bichloride with iodine alcohol.

Roundworms.—Kill in 70 per cent alcohol heated to about 80° C. Allow to cool.

Ova.—Kill as for roundworms, or simply add about 5 per cent formalin.

PRESERVING.

Transfer to 70 per cent alcohol-5 per cent glycerin mixture. (Except formalized ova.)

CLEARING WITHOUT STAINING.

Roundworms and ova.—Clear on the slide with caustic-potash solution (30 per cent) or with glycerin, or first with the caustic, followed by glycerin. Clear in bulk by allowing the alcohol to evaporate from a glycerin-alcohol mixture, leaving sufficient glycerin to cover the specimen.

Flatworms.—May be treated as for roundworms, but are usually stained (q. v.).

MOUNTING FROM GLYCERIN.

Either mount directly in glycerin, ringing cover glass heavily with cement or balsam or (for more durable preparations) transfer to glycerin jelly, mount, and ring cover glass.

STAINING AND MOUNTING IN TOTO.

Flatworms.—Flatten between two slides held by a rubber band and stain in carmine from one or two to twenty-four hours or longer. Remove from between slides and decolorize in alcohol or in acid alcohol, watching progress of decolorization under microscope. Replace between slides and pass through dehydrating alcohols to xylol and mount in balsam. (If aqueous carmine is used, the specimen need not be compressed until after decolorization.)

Roundworms and ova.—Little or nothing can be gained by attempting to stain ova or roundworms except when the latter are first sectioned.

SECTIONS.

Flatworms.—Usually stained in bulk before sectioning. Dehydrate, clear, and imbed in paraffin, carefully orienting the specimen. Cut sections thick.

Roundworms.—Sections seldom needed. Cut worm in pieces to allow fluid to penetrate from the ends. Impregnate thoroughly with a hard paraffin. Cut thick sections and stain on the slide in alcoholic carmine.

DEPOSITING SPECIMENS AT THE NAVAL MEDICAL SCHOOL.

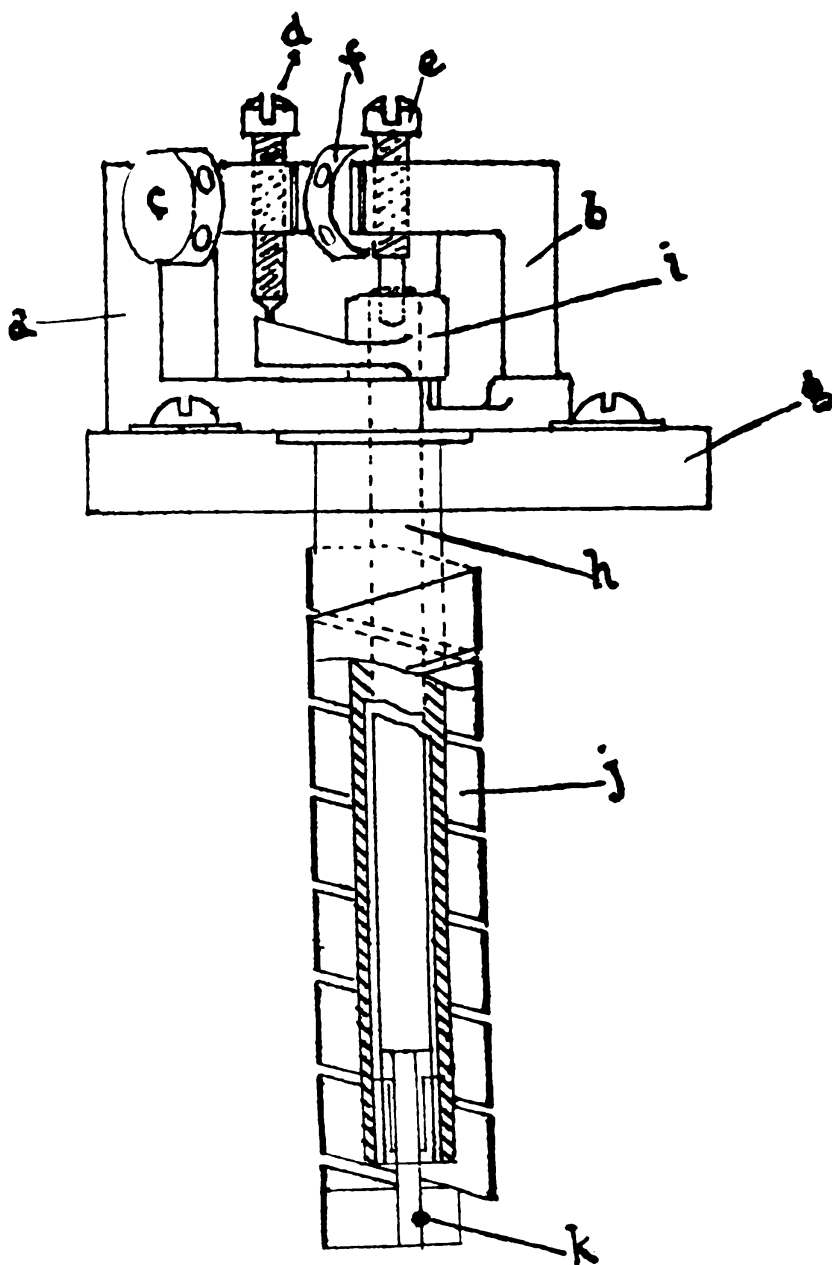
By depositing helminthological specimens in the school collection either before or after they have been studied, their preservation is assured. On receipt they are promptly catalogued with all available information and given an accession number, of which the contributor is notified, and a list of additions to the collection is published in each number of the NAVAL MEDICAL BULLETIN. Specimens so deposited are held accessible for further study at any time and are indispensable for demonstration purposes in the courses of instruction at the school.

**SPECIMENS ADDED TO THE HELMINTHOLOGICAL COLLECTION, U. S. NAVAL
MEDICAL SCHOOL, JUNE-AUGUST, 1910.**

Catalogue No.	Name.	Host.	Collected by or received from—
124	<i>Hymenolepis nana</i>	<i>Homo</i>	M. A. Stuart, Panama.
125	.....do .....	.....do	Do.
126	<i>Hymenolepis</i>	White rat	P. E. Garrison, District of Columbia.
127	<i>Hymenolepis</i> (ova) .....	.....do	Do.
128	<i>Trichinella</i> (embryos) .....	.....do	Garrison and Burton, District of Columbia.
129	<i>Tænia saginata</i> (adult)	<i>Homo</i>	J. R. Dykes, U. S. Naval Medical School Hospital, District of Columbia.
130	<i>Tænia</i> (22 feet 7 inches) .....	.....do	R. M. Kennedy, Porto Rico.
131	<i>Tænia</i> .....	.....do	Do.
132	Hookworms (attached to intestine) .....	.....do	Do.
133	Ova of <i>Necator americanus</i> .....	.....do	Do.
	<i>Trichuris trichiura</i>		
	<i>Ascaris lumbricoides</i>	White rat	Garrison and Burton, District of Columbia.
134	<i>Trichinella</i> (embryos)		
135	.....do .....	.....do	Do.
136	<i>Cysticercus</i>	<i>Mus musculus</i>	Do.
137	.....do	<i>Mus decumanus</i>	Do.
138	<i>Filaria immitis</i> (adult)	<i>Canis familiaris</i>	Bureau of Science, Manila.
139	<i>Fasciola hepatica</i>	<i>Bos</i>	Do.
140	<i>Anchylostomum trigenocephalum</i> .....	.....do	Department of Agriculture, Bureau of Animal Industry.
141	<i>Oxyuris vermicularis</i>	<i>Homo</i>	Bureau of Science, Manila.
142	<i>Fasciolopsis</i>	<i>Bos</i>	
143	<i>Dicrocoelium lanceatum</i> .....	.....do	Do.
144	<i>Opisthorchis felineus</i>	<i>Felis domestica</i>	Do.
145	Ova: <i>Fasciola hepatica</i>	<i>Bos</i>	Do.
146	<i>Necator americanus</i>	<i>Homo</i>	Do.
147	<i>Dibothriocephalus</i> sp.	<i>Felis domestica</i>	Do.
148	Ova: <i>Schistosoma hæmatobium</i>	<i>Homo</i>	Porto Rico.
149	Monostome	<i>Halycon coromand</i>	Bureau of Science, Manila.
150	<i>Tænia echinococcus</i> (adult)	<i>Canis familiaris</i>	Do.



IMPROVISED INCUBATOR, McGUIRE.



STANDARD TYPE NAVY THERMOSTAT.

- a. Support for adjustable contact screw.
- b. Support for adjustable screw for thermostatic coil spindle.
- c. Lock screw for contact screw ("d").
- d. Contact screw.
- e. Adjustable screw for securing upper end of thermostatic coil spindle.
- f. Lock screw for adjustable screw ("e").
- g. Slate base.
- h. Thermostatic coil spindle.
- i. Contact maker.
- j. Thermostatic coil or German silver spring.
- k. Keeper pin for securing thermostatic coil to lower end of spindle.

SUGGESTED DEVICES.

AN IMPROVED INCUBATOR FOR SHIPS.

By Asst. Surg. L. W. MCGUIRE, U. S. Navy.

Owing to the large amount of bacteriological work which is done on the ships of the service, it was found necessary to devise some means of growing cultures. It has been the custom to carry culture tubes around in pockets or place them in a warm part of the ship, such as the evaporator room, which is inconvenient and unsatisfactory.

To overcome these difficulties and facilitate bacteriological work, an electric incubator has been made. It can be set to maintain any desired temperature, suitable for growing bacteria, within 1° F., by means of a contact screw (D) of thermostat, a few adjustments being necessary, after which it requires no further attention.

The thermostat is the same as used in the ship's magazines to indicate a rise of temperature, the spring (J) expanding, making the current which rings the bell. In the incubator it is reversed; when the spring expands the current is broken and the lights go out, lowering the temperature; as the temperature falls the spring contracts, making the current and the lights go on, raising the temperature, the heat being generated by electric bulbs. The thermostat is so sensitive that practically an even temperature is maintained at all times, and is made suitable for use in the incubator by reversing the contact maker (I) and doing a small amount of filing.

The thermostat is used aboard all ships and can be installed by any electrician.

The incubator was made entirely aboard ship, at practically no cost, as all necessary material was at hand, it being made of wood, lined with asbestos, and the work done by the ship's carpenters and electricians. It has been used on board the *Montana*, attached to the bulkhead in the dispensary, where it takes no room and is convenient. During the six weeks it has been in use it has been entirely satisfactory.

Arrangement is shown by accompanying photograph and drawing.

This incubator is used in preference to those formerly described for use aboard ship, because of its simplicity of construction at little or no cost.

AN EFFICIENT RAT-KILLING DEVICE FOR USE ON BOARD SHIP.

By Passed Asst. Surg. F. M. MUNSON, U. S. Navy.

The device described below was made and successfully operated on the *Monterey* by Machinist G. L. Russell, U. S. Navy.

The apparatus consists of a piece of dry wood one-half inch thick, 2 inches wide and long enough to extend the width of a door, resting on the sill. Upon this piece of wood is screwed two pieces of three-eighths inch copper, spaced 1 inch apart, each strip being connected, respectively, to the positive and negative electric-light wires by means of the ordinary attachment plug. The rat on entering a room must naturally step from one copper strip to the other, causing a short circuit through its body, which instantly kills it. A voltage of 110 is necessary for the successful working of this apparatus.

CLINICAL NOTES.

A CASE OF ATYPIC TYPHOID WITH SUDDEN DEATH.

By Surg. E. R. STITT, U. S. Navy.

A Filipino ordinary seaman was admitted to this hospital with the diagnosis of "bronchitis acuta." He had been on the sick list for two weeks at the Cavite Yard Dispensary and, a few days after being sent to duty, returned with a temperature of 104° F. and complained of headache, malaise, and cough.

Physical examination of the chest showed no disease of lungs. The heart was normal except for a slightly muffled first sound, and a very pronounced apex beat on a level with the nipple and three-fourths inch to the right. Examination of the stools showed ova of *Ascaris* and *Trichocephalus*.

The blood was negative for parasites. The white count was low—only 3,200. The differential count was Polys. 57, S. L. 20, L. L. 15, L. M. N. 2, Trans. 6. The urine contained only a very slight trace of albumen, and a few finely and coarsely granular casts.

The only subjective symptom that could be obtained was a feeling of pain in knees and ankles, and these as well as the calves of the legs were very painful on pressure. The deep reflexes were apparently absent. Dengue was first thought of, in view of the marked leucopenia, but as the fever continued, this hypothesis was abandoned in favor of acute articular rheumatism. Inasmuch as the joints did not become swollen, and the patient did not improve under salicylates, another diagnosis was sought. Endemic neuritis was considered, but dismissed because of the continued fever. Miliary tuberculosis was deemed the most probable diagnosis, although sputum and stools were negative.

It was not until ten days had elapsed that typhoid was seriously considered, as the disease is not very common among the natives of the Philippines, and so far as known, there had been no recent cases in Cavite or vicinity.

There were no signs or symptoms to warrant such diagnosis, but a positive Widal was obtained, good clumping in 1-to-40 dilution. To guard against error a number of tests were made, all positive, and typhoid cultures were grown from the blood. Diazo reaction was

positive. At this time the evening temperature was about 103° and patient was occasionally slightly delirious; there was considerable œdema of ankles and legs, a very diffuse apex beat, marked diastolic murmur, and a blood pressure of only 70 mm.

A few days later "wrist drop" was observed. The œdema gradually left the lower extremities, and it was noticed that "ankle drop" existed and that hypersensitiveness was not so marked, although severe pain in the knees was complained of. A week followed, during which patient was apparently on the road to recovery. The morning temperature was normal, evening rise about 100° , the tongue was clearing, and the heart was doing well. Then on two successive days, following a chill in the morning, the temperature went up to 100° . Repeated blood examination failed to show the malarial parasite or any leucocytosis. The next two days the temperature was nearly normal and the feces appeared to be almost normal. (An enema was given daily.) The urine showed only a slight trace of albumen. The patient was thought to be doing well. Death occurred very suddenly. The nurse's attention was attracted by a slight noise made by the patient; upon going to the bed the nurse found him dead.

The autopsy showed numerous typical typhoid ulcers; one about an inch in diameter near the beginning of the cæcum had nearly perforated. The right side of the heart was soft and somewhat flabby. The other organs were practically normal.

Only about seven-tenths of 1 per cent of the typhoid cases in Osler's series were complicated by neuritis. In this case, in view of the comparative frequency of beriberi in the Philippines, the coexistence of both beriberi and typhoid is quite possible, and the sudden death could the more easily be accounted for by such an hypothesis.

A CASE OF EXCISION OF THE CLAVICLE.

By SURG. RAYMOND SPEAR, U. S. Navy.

H. C. B., ship cook, first class (colored, age 34); family history, negative; no history of tuberculosis or syphilis; tuberculin reaction positive—Wasserman reaction negative; no history of injury to left clavicle.

Attention was first drawn to left shoulder by presence of pain in February, 1909; it was more noticeable when the left arm was used; the pain was at first diffuse, but finally radiated from region of the left clavicle.

In May, 1909, a small swelling became apparent at the junction of the outer and middle third of the left clavicle. The tumor was hard and somewhat tender.

On admission to the Naval Medical School Hospital on February 1, 1910, there was a hard tumor mass about the size of a hen's egg

involving the left clavicle. The tumor was tender on pressure, the surface of the tumor presented nodules of different sizes; there was no sense of fluctuation at any point.

Both the anterior and the posterior chains of glands on the left side of the neck were slightly enlarged.

A positive diagnosis of tuberculous disease was made on the gland involvement in the region of the tumor on the positive tuberculin test, and finally on the X-ray findings, which showed that the acromial end of the clavicle entirely separated from the disintegrated portion of the clavicle adjoining it.

On February 15, 1910, under ether, an incision was made over the entire length of the clavicle and continued through the periosteum. The tumor mass consisted of bone fragments and cheesy tuberculous material; these were removed, care being taken to preserve all the periosteum possible. The periosteum was next loosened and as the clavicle was already divided it was an easy procedure to remove both ends of the bone from the periosteal coverings.

The clavicle is in intimate relation with the large blood vessels of the neck, the subclavian, suprascapular, and internal mammary arteries, the innominate, subclavian, and jugular veins; it also is above the cords of the brachial plexus, the pneumogastric nerve, and the thoracic duct. The pleural cavity is also in close proximity.

In some cases the subclavian vein is diseased and its removal makes the operation a formidable one. In all cases where it is decided to remove the clavicle the operation is made much easier and safer if the bone is first divided subperiosteally, preferably by means of a Gigli saw. The severed ends can then be lifted upward and the periosteum can be more readily separated.

The after history of the case has been very satisfactory. The wound healed by primary union and the clavicle has regenerated, as shown by an X-ray picture.

The man can now raise his left arm above his head and there is every prospect that he will return to duty.

The pathological report was that the process was tuberculous.

APPENDICULAR ABSCESS—RUPTURE INTO PERITONEAL CAVITY—OPERATION AND RECOVERY.

[From the U. S. S. *Chester*.]

By Passed Asst. Surg. A. D. McLEAN, U. S. Navy.

E. H. A., bk., second class; age 23½ years.—No history of previous attacks. Was perfectly well until the time the ship left Hampton Roads, Virginia, December 7, 1909, for Guantanamo Bay. He is quite susceptible to seasickness, and as the sea was quite rough on the run

down he was ill during the entire voyage but did not report for treatment, for he thought his illness was due entirely to the motion of the ship. He suffered from loss of appetite, nausea, constipation, and pain in his abdomen, but as his illness did not clear up after reaching Guantanamo he reported for treatment the following morning, December 11, 1909.

Temperature, 101° F.; pulse, 98; bowels constipated; marked tenderness over the region of the appendix and a slight doughy mass was palpable in the right inguinal region. As he had been ill for the last ninety hours (with a doubtful diagnosis, on his part, of seasickness), without reporting for treatment, I decided not to operate at once, but to wait until this slight doughy mass was more pronounced, circumscribed, and securely walled off. Patient was placed in a bunk which had been raised at the head; bowels moved by enema, nothing given by the mouth except sips of water every half hour, and all nourishment given through the rectum. For the following two days he did nicely—temperature, 100.5° F.; pulse, 88; pain steadily decreasing; and the tumor mass more superficial and circumscribed. An operation was decided upon for the following day, but about 5 o'clock that same afternoon he felt so much better and so hungry that, during the absence of the hospital apprentice, he got up and went out to the mess tables in the adjoining compartment and ate two slices of bread and drank a cup of water. This information was not obtained until sixteen hours later. About 4 o'clock the following morning he complained that the pain in his side was steadily increasing. Four hours later the temperature was up to 102° F., pulse 104, and the pain quite severe. Hypodermics of morphine, gr. $\frac{1}{4}$, and digitalin, gr. $\frac{1}{16}$, were necessary to control the pain. The operating room was prepared at once, and just previous to administering the anæsthetic he stated that he had just felt something give way in his side and that the pain was not now so severe. He also at this time told us about his getting up and eating the bread, which up to this time we did not know. Ether was given and an oblique incision was made over the outer half of the tumor, and on opening the peritoneum pus and serum escaped from the abscess cavity beneath it. In view of his statement of having felt something give way in his side just previous to taking the anæsthetic, I was very careful in exploring the abscess cavity. Almost as soon as I introduced the finger I detected a rupture in its internal wall and no further exploring was done. The cavity was very gently flushed with normal salt solution, a drainage tube inserted, and the abdominal incision partially closed. After placing him in a bunk in the Fowler position a hypodermic of morphine, gr. $\frac{1}{4}$, and digitalin, gr. $\frac{1}{16}$, was given to allay peristalsis. That evening 750 c. c. normal salt solution was introduced into the rectum. He improved steadily, and on the third day following the operation his temperature was

down to 99° F., where it remained for seven days. He then started to run a septic temperature, which lasted for four days, when an abscess in the immediate vicinity of the wound was found and drained. The following day the temperature and pulse dropped to normal, where it remained. There still is a slight discharge from the wound. This case is interesting in that the man's own supposition of seasickness prevented him from reporting for treatment until after he had been ill for over ninety hours. How long he actually had appendicitis before reporting is in doubt, but I am inclined to think that it came on in the early stages of his illness and that this illness was due to seasickness and appendicitis.

The rupture found in the abscess wall occurred no doubt at the time when the patient felt something give way in his side followed by the abatement of pain, and this rupture very probably was due to the violent peristalsis set up in that vicinity by the bread which he had eaten, and the very short interval from the time of rupture until an incision was made into the abscess cavity may have been the deciding factor in preventing a general peritonitis.

CASE OF SUPPURATIVE APPENDICITIS.

[From the U. S. S. *Dubuque*.]

By Asst. Surg. C. W. SMITH, U. S. Navy.

On October 18, 1909, while the ship was on the target grounds off Cape Cruz, Cuba, G. T. K., cabin steward, reported to the sick bay complaining of pain in the stomach. Examination of patient revealed presence of distinct tenderness and pain in the right iliac region. Gentle palpation showed presence of a distinct mass in the region of the appendix. Patient's temperature was 102°, pulse 100, and leukocyte count 20,000. Condition was recognized as serious, and preparations were made for operation. Within the next twenty-four hours a septic chill developed with temperature of 104°. On October 20, under ether anesthesia, incision was made directly through the abdominal wall over the most prominent part of the mass. Several pus pockets, fairly well walled off by adhesions, were found and evacuated. The appendix was found firmly bound down by adhesions, gangrenous, and ruptured. It was removed in part and wound swabbed out with small dry-gauze sponges. The abdominal incision was closed in part, packed with gauze, and the patient returned to bed in Fowler's position. Murphy enteroclysis was maintained intermittently for forty-eight hours and worked most satisfactorily. Temperature dropped to 100° after operation and on the 22d was normal.

When the abdominal pack was removed it had a distinctly fecal odor, but no fistula developed and convalescence was rapid with no complicating conditions. Patient was discharged to duty November 15 with wound entirely healed.

MENINGITIS OF PRIMARY ORIGIN (PNEUMONOCOCCUS).

By Surg. E. H. STITT, U. S. Navy.

The case here reported is of interest not only because of the comparative rarity of this disease, but also because of the absence of the usual symptoms and the difficulty of reaching an ante-mortem diagnosis.

The patient was 14 years of age, over 6 feet tall, and large in proportion. His parents stated that he had been growing very fast in the last year or two, and that for about two weeks was apparently "getting stupid and wanted to sleep all the time." They further stated that he had had three attacks of acute articular rheumatism, preceded by tonsilitis, the last one in August, 1909.

He arrived in Cavite one month ago and felt well until two weeks ago, when he complained of headache and photophobia.

On admission, he had to be supported on walking, but there was nothing characteristic in his gait; it was apparently that of a person overcome with sleep. On sitting or lying down he would immediately fall into a lethargic condition, from which he could be aroused, and was able to answer intelligibly the few questions asked him. He was a mouth breather, with typical facies. There was no evidence of otitis media or nasal disease, and pharynx was normal except for hypertrophied tonsils. Pupils were normal in size, equal, and reacted to light. Knee jerk could not be elicited, but plantar reflex was normal. *Tache cérébrale* was very marked. There was no parasthesia or other evidence of sensory or motor disturbances. Temperature was 101.5°, pulse 88, respiration 24. Blood examination showed: R. B. C., 4,800,000; Hbg., 80 per cent; W. B. C., 10,500; Polys., 84; S. I., 6; L. L., 6; L. M. N., 6; blood pressure, 110 mm. Widal was negative. Patient could not be induced to urinate, so urine was drawn by catheter and showed acid reaction, sp. gr. 1.030; marked trace of albumen, one-tenth of 1 per cent; no sugar; finely and coarsely granular casts. An enema was given, and stool obtained was normal. Examination of the chest revealed nothing abnormal except a slight systolic murmur not transmitted to axilla. Abdominal organs were apparently normal. Ophthalmoscopic examination showed marked enlargement and tortuosity of the veins, and patches and streaks of exudate along the course of the veins.

The second day in hospital patient showed no decided change—stupor was more profound, pupils more sluggish, and he passed his urine involuntarily.

On the third day temperature began to rise steadily. The urine showed 0.119 per cent ammonia and the one-tenth of 1 per cent of albumen was nearly all nucleo-albumen.

On the morning of the fourth day right-sided hemiplegia was first observed, and a slight rigidity of neck was observed while examining the background of the eye; the right side of the forehead perspired freely, the left side being dry. Optic neuritis was more marked, and the pupils no longer reacted to light. Patient made slight restless movements with the left hand and arm only. He could no longer be aroused sufficiently to take nourishment by mouth.

Shortly before death, a little over four days from date of admission, the temperature had reached 108° by rectum.

Lumbar puncture was not made, since at first the cerebral symptoms were thought to be secondary to some other condition, as typhoid or other specific fever, kidney disease, or embolus from heart. The symptoms usually found in meningitis were mostly absent; thus there was never any chill, vomiting, delirium, tremor, rigidity of the muscles (except the day before death), nor sensory symptoms except slight headache and photophobia, nor motor symptoms, as twitchings and tremors, nor strabismus, nor slow pulse.

Autopsy findings were as follows: Membranes of brain slightly thickened; large amount of turbid flocculent fluid in upper part of subarachnoid; left lateral ventricle, especially anterior horn, filled with greenish, purulent, very viscid material. Heart showed vegetations on mitral leaflet. Other organs were apparently normal. Smears of the fluid showed a capsulated Gram-positive coccus in chains and groups in great abundance. Culturally, the organism was pneumococcus. The injection of the turbid fluid in the ear vein of a rabbit without result indicates the low virulence of the organism.

A CASE OF METASTATIC PNEUMONIA COMPLICATING TONSILITIS.

[From the U. S. S. *Tennessee*.]

By Passed Asst. Surg. W. A. ANGIN, U. S. Navy.

R. A. V., plumber and fitter, was admitted October 4, 1909, with suppurative tonsilitis. On the 6th and 7th the temperature was intermittent, with sweating. On the 8th a small peritonsillar abscess was opened. Severe constitutional symptoms with delirium, suggestive of toxic absorption, appeared. Slight broncho-vesicular breathing and some moist râles were present in the left lung posteriorly. Pa-

tient complained of severe pains and tenderness in right side of abdomen, with diarrhea and slight rigidity of right rectus; temperature 103° to 104°.

On the 9th temperature fell to normal, but indefinite abdominal symptoms persisted, suggesting at times appendicitis and again hepatic abscess. No signs of pneumonia at this time, but the next day the fever rose to 106°, the pulse and respiration became rapid, and a positive diagnosis of double pneumonia was made. The confusing abdominal symptoms persisted, accompanied by considerable tympanites. Later respiration became bronchial over both lungs posteriorly, the respirations rose to 48, temperature 106°, delirium supervened, and death occurred on the 18th.

Autopsy.—No abnormal condition of the abdomen. Both pleurae almost completely covered with a fresh fibrinous exudate. The right pleural cavity contained about 650 c. c. of cloudy fibrinous fluid. On the left over the lower lobe was a patch of exudate, about 6 cm. in diameter. Both the lower and right middle lobes were in a stage of red hepatization, with numerous necrotic areas.

Blood cultures taken prior to death showed staphylococcus albus, which may have been due to skin contamination.

The pleural exudate showed a lanceolate bacillus 3 μ long, similar to the pneumo-bacillus.

The pus from the abscess gave an apparently pure culture of staphylococcus albus.

REPORT OF A CASE OF ACUTE YELLOW ATROPHY OF LIVER.

By Surg. E. R. STIRT and Hospital Steward D. A. GREGORY, U. S. Navy.

A. K., a coal passer on the *Bainbridge*, complained of feeling unwell on April 19, 1910, and was relieved from watch that evening. The following morning he was seen by the hospital apprentice of the torpedo-boat destroyer, who considered the case one of ordinary jaundice. Later in the day, however, the patient complained of very severe headache with vomiting. The medical officer of the flotilla was then called on board, and it was decided to send the man to the hospital.

The patient was admitted to the hospital at 10 a. m. on April 21, and was seen to be extremely jaundiced. Upon attempting to make a physical examination he became violently delirious, and continued to manifest this maniacal delirium when touched in any way until he became comatose that night.

Rectal temperature 98° F., pulse normal. Percussion over liver area seemed to show normal limits. Normal white count. No parasites in blood. Examination of a specimen of urine, taken by cathe-



LIVER FROM CASE OF ACUTE YELLOW ATROPHY.

(The light areas in upper portion show the reddish islets in the boxwood colored background.)



CASE RESEMBLING RHINOPHARYNGITIS MUTILANS, STITT.



PERFORATION OF PALATE IN CASE RESEMBLING RHINOPHARYNGITIS MUTILANS.
STITT.

terization, showed slight traces of albumin and a few finely granular casts.

Determination of total nitrogen showed 0.56 per cent and of nitrogen as ammonia 0.13 per cent, almost 25 per cent of nitrogen elimination being as ammonia. A very marked fluorescence was obtained with Schlesinger's test for urobilin. Upon evaporation numerous leucin spheres and a few tyrosin sheaves were seen.

On April 22 patient was deeply comatose, with increasing jaundice, so that surface of body was almost olive-green yellow. Percussion of liver area seemed to indicate a reduction in the limits determined the previous day. White count was 15,000 and rectal temperature 100° F., with a pulse rate of 90.

The examination of urine showed a slight trace of albumin and very numerous finely granular casts. Leucin and tyrosin were again found in evaporated urine. These bodies were never found in unconcentrated urine. The average of two examinations showed the total nitrogen to be 0.92 per cent and the nitrogen eliminated as ammonia to be 0.267 per cent, almost 30 per cent eliminated as ammonia. The urobilin test was intense.

The patient died on the morning of April 22.

Autopsy showed deep yellow staining of all subcutaneous tissues. The mesentery, as well as the serous coat of the large intestines, was dotted with petechial spots. The stomach and duodenum were filled with altered blood, and the mucous membrane of the intestines was studded with spots of hemorrhagic infiltration.

The gall bladder and bile ducts were normal, as was the pancreas. Upon removal of the liver, the ease with which it could be rolled upon itself was noted, as was also the slight wrinkling of the capsule. Upon section a striking boxwood color was seen with scattered areas of brownish-red color in the upper median portion of the right lobe. (Shown in photograph as light areas.)

Frozen sections from the liver, stained with Sudan III, showed total degeneration of parenchymatous liver cells of peripheral and central portion of the lobule, only a few cells undergoing fatty degeneration, showing in a band located in intermediary zone.

Petechial flecking was observed over visceral pericardium, but heart appeared normal.

Of peculiar interest in this case were—

1. The very great preponderance of leucin spheres over tyrosin crystals.
2. The intensity of the fluorescence in the urobilin test, at least ten times as great as was observed in a marked case of malarial cachexia at that time under treatment in the hospital.
3. The fact of the elimination of almost 30 per cent of the nitrogen as ammonia, about six times that which obtains normally.

A CASE CLINICALLY RESEMBLING RHINOPHARYNGITIS MUTILANS.

By Surg. E. R. STITT, U. S. Navy.

The patient, a young Filipino, who was born in and had never been outside of Cavite Province, presented himself at the hospital for treatment. The accompanying photographs show the lesions. Statement was made that the ulcerative process commenced eight months previous to the time of examination.

There are two points of interest in this case:

1. Smears made from the different parts of the ulcerating surface showed the delicate spirillum and fusiform bacillus characteristic of Vincent's angina in the greatest profusion.

2. In order to close the perforation between oral and nasal cavities the patient had carved out a plug of paraffin candle of a size to fit the opening. The plug was $1\frac{1}{2}$ by $\frac{3}{4}$ inches. The location from the hard palate can be seen in the photograph, as well as the projecting rounded apex in the floor of the nose. The apparatus seemed to afford him the greatest comfort and suggested the possibility of the use of some similar contrivance of rubber or other material for the use of the victims of gangosa in Guam.

EXTERNAL URETHROTOMY WITHOUT A GUIDE.

By Surg. E. G. PARKER, U. S. Navy.

J. D., g. m., first class, appeared at the sick bay one morning suffering from acute retention of the urine, due to an old stricture. He had put off consulting the medical officer until target practice should be over.

The stricture had been closing gradually during the past month and had given him much trouble. His bladder was distended well above the umbilicus and his distress was very great. After repeated attempts a filiform bougie was finally thought to have passed the stricture. On attempting to urinate not one drop could be passed. Vesical tenesmus was extreme. He was prepared for operation and given ether. A sound was passed down to the stricture as a guide. An incision was made in the median line down to the tip of this guide. The filiform bougie which was thought to have passed the stricture was found curled up in the urethra. The operation was therefore continued without guide. By careful incision and following the median line the urethra was divided to a point beyond the stricture. Then followed a gush of foul ammoniacal urine laden with pus. The stricture was about 2 inches in length and was tough and fibrous. A catheter was left in the bladder and drainage through the perineal opening was established. On the fifth day after operation sounds up to No. 24 were passed into the bladder via the penile urethra. Daily bladder irrigation was practiced thereafter. On the eighth day the drainage

catheter was removed. The perineal wound closed in about four weeks and convalescence was uneventful. Urine remained cloudy for some weeks, but subsequently cleared up. Patient takes a No. 30 sound without difficulty. He was operated on for a like condition about ten years ago while in the naval hospital, New York.

**NOTE ON THE POSSIBLE EXISTENCE OF BOTH AGCHYLOSTOMA DUODENALE
AND NECATOR AMERICANUS AT GUAM.**

By Surg. E. R. STITT, U. S. Navy.

During the stay at Cavite of the U. S. S. *Supply*, the station ship at Guam, a patient was sent to the Canacao Hospital with amœbic dysentery. Later on, hookworm eggs having been found in his fæces, he was given thymol treatment and considerable numbers of *N. americanus* and a few of the old-world species of hookworm were obtained from the treatment.

The man had been in Guam about one year and stated that he had previously had good health. He was born in New York.

The fact that this man had in a previous enlistment served in the Philippines would bring up the question as to his having contracted the infection in Guam. While both species of hookworm have been reported for the Philippines only *N. americanus* has so far been reported from Guam.

CURRENT COMMENT.

[It is to be remembered that in the publication of these comments the bureau does not necessarily undertake to indorse the opinions expressed, but will lend the pages of this section to discussion of such contemporary topics as will be of interest and value to the service.]

NEW ORDER FOR APPOINTMENT OF MEDICAL OFFICERS IN THE NAVY.

The Navy Department on August 19 authorized the immediate resumption of issue of permits for examination for direct appointment to the grade of assistant surgeon; a diploma showing at least one year's hospital experience will now be required, while the examination for entrance will be made decidedly practical. The theoretical part of the examination will be continued on its customary high plane, but for promotion it is expected that the fitness therefor will in a much greater measure be determined by the medical officer's record.

All acting assistant surgeons now in the service were ordered to be examined on September 12 for appointment as assistant surgeons, and should anyone fail to qualify, he will be given the winter course at the Naval Medical School and again examined upon its completion about April 1, 1911.

NEW NAVAL HEALTH RECORD.

The department having on July 12 authorized the adoption of naval health records to accompany each officer and enlisted man of the Navy and Marine Corps, this important innovation will go into effect with the new year, as forecasted in the January issue of the BULLETIN.

While this step has been under consideration for some years and has been advocated by a number of medical officers, it has been postponed owing to certain difficulties in connection with the general make-up of the records themselves and their subsequent disposition, particularly in the case of officers. It is believed, however, that these objections have now been satisfactorily overcome, and while official instructions will, of course, be issued with the records, a few pre-

liminary observations relative to the purpose of the proposed change may smooth the way of its introduction.

The chief aim of the new system is to furnish the attending medical officer with a complete history of his patient's physical condition throughout his career in the service, an advantage so obvious as to require no comment. Each record will be complete in itself, no longer dispersed through various medical journals, case papers, and hospital tickets. The latter will hereafter be simply an official permit authorizing the patient's transfer and containing no clinical data whatever. There will thus be not only increased accuracy and convenience, but, it is believed, a great saving in clerical work. The health record is a booklet 10 inches long by 4½ inches in width and consists of a separable cover with removable slips, thus providing for expansion in cases of unusual length. Those for enlisted men contain, first, blanks to be filled by the examining surgeon upon enlistment, containing the usual descriptive data. Following these are blank pages for the medical history, which is to be kept in the manner similar to the present case paper; daily entries are not required, but no essential details regarding origin, course, duration, and treatment will be omitted. At the back of the booklet there is an "abstract," to be kept up to date in all cases, containing a brief synopsis of the medical history. The record concludes with entries showing vaccinations, marks and scars since enlistment, and information pertaining to the man's discharge.

Health records are to be in the medical officer's keeping, to be forwarded by him when transfer occurs. Ordinarily this will be to his new ship or station, but in case he is on detached duty his record will be temporarily sent to the medical officer at the same station where his accounts are kept, and if illness or injury occurs during such period the Bureau of Medicine and Surgery will complete the record so far as practicable. Upon termination of service the record will be completed and forwarded entire to this bureau, unless the man reenlists immediately, when a new record will be opened, the former "abstract" retained and *appended* thereto, and the remainder of the original health record sent on for the bureau's files. Should reenlistment occur at a later date, the original "abstract" will be forwarded by the bureau for use as above. To this end the present Form X will be modified, the data for each recruit examined, being entered on a separate card. As these cards are sent in as soon as the reenlistment occurs, the bureau will be promptly advised thereby when an "abstract" is required.

Officers' health records are in the main similar to those for enlisted men, but, as a single record runs through service in an entire grade, it is inadvisable for the bureau to be without information for so

long a period; therefore, all slips in the medical history containing entries made during the preceding twelve months are detached annually and forwarded to the bureau; the medical officer, however, retains the remainder of the health record, including the "abstract," until the officer is promoted or his services terminate.

While any radical change in established custom involves a certain amount of temporary inconvenience, it is believed that the introduction of this system on January 1, 1911, may be accomplished without serious embarrassment. It is not contemplated that every enlisted man then in the service is to have a health record; on the contrary, such records are to be opened only for individuals actually on the sick list of ships and shore stations or as they subsequently appear for treatment. All medical journals will be closed and forwarded to the bureau, current cases being continued by opening their health records. Case papers, however, will be carried on to completion in the case of all patients actually in hospital December 31. It will thus be evident that the introduction of the health record will not involve any sudden and overwhelming amount of clerical labor, as some have been led to anticipate.

New Forms G and X will be distributed in ample time for use on January 1, but in the event of any ship or station failing to receive the new issue the nearest naval medical supply depot should be requested to furnish them. Quarterly Form F, beginning 1911, will show names in alphabetical order, Form F₂ will be discontinued, and in all probability Form K will be compiled in the Bureau instead of on ships and stations.

DIPHTHERIA PROPHYLAXIS.

The following is the text of an order recently issued by the bureau by circular letter through official channels. An article on the subject, by Surg. C. S. Butler, will appear in the January BULLETIN.

In future, in the presence of an outbreak of diphtheria, general prophylactic dosage with antitoxin will not be employed.

All clinical and laboratory cases will be promptly isolated or removed, if possible, and their quarters and all objects brought into contact with them will be thoroughly disinfected. In these cases the earliest possible administration of antitoxin should be employed. Thus given, antitoxin has achieved some of the most brilliant results in the field of medicine.

The fauces of all individuals who have been exposed should be carefully studied clinically and bacteriologically and their cases dealt with according to the findings. As antitoxin does not kill the organisms, the use of local antiseptics is imperative.

The discontinuance of the general use of antitoxin as a prophylactic against diphtheria is based upon the following:

1. Thirty cases of death or perilous prostration have followed its use principally in those of a lymphatic type and in persons predisposed to asthma.

Some body in horse serum is responsible for these dangerous results, not the antitoxin.

2. The immunity produced is short lived (about twenty-one days) and is not an antibacterial immunity.

3. The crews of ships are constantly under medical supervision and suspects and frank cases can be promptly isolated.

4. There is the possibility, though remote, of the prophylactic dose so sensitizing an individual that, if a second dose were necessary, it could cause alarming symptoms or a fatal result.

5. Antitoxin prophylaxis is expensive.

6. The outlined plan of attack, with the free use of antitoxin in the treatment, will satisfactorily and safely control an outbreak.

PECULIAR ADVANTAGES OF LOCAL ANAESTHESIA IN ORDINARY HERNIA OPERATIONS IN THE NAVAL SERVICE.

By Surg. H. C. CURL, U. S. Navy.

The use of local anaesthesia in surgical operations has been so thoroughly developed of late that its general advantages must be accepted as proven. It finds a particularly successful field in inguinal and other hernias and the following special advantages to the naval surgeon:

1. The operation can be done, when desired or necessary, by one medical officer, assisted by one steward or apprentice.

2. During operation, rapidity is not such a factor, and I believe that one is more careful and certainly more gentle than when a general anaesthetic is used. Another small but quite advantageous point is that you can tell the patient to "bear down" and thereby identify the "bulge" of the sac without delay.

3. The apparently trivial nature of the operation where a local anaesthetic is used, makes patients more willing to accept operation and to minimize its severity in talking to others.

4. Immediately after operation, patient is returned to bed and no special treatment needed, except possibly an anodyne later.

Among things to be remembered are: To give a hypodermic of morphia thirty minutes before operation; to keep the patient's head low and to keep in touch with his mental condition, assuring nervous patients of the slightness of any possible pain and to *not* pull on the sac more than is absolutely necessary, for it is the parietal peritoneum only which is sensitive.

The infiltration of the skin enables exposure of the fascia of the external oblique, the fibers of which can as a rule be separated without infiltration; *be sure* that the field is *clear* of blood before going through this fascia, for the easy identification of the two nerves necessary to be blocked depends upon a clear view of the tissues below.

At this point, a careful blocking of these nerves enables the completion of operation without pain.

Either cocaine or novocaine may be used.

As a rule, patients experience no pain, and I was assured by a medical officer on whom I was operating, that he felt nothing after the first skin puncture, except when traction was made on the sac.

I have of course not been as successful in operating on recurrent cases, as the anatomy is obscured and "blocking off" is difficult.

I believe local anaesthesia should be the routine in all uncomplicated cases of inguinal hernia and may be used in many others.

PROGRESS IN MEDICAL SCIENCES.

CHEMISTRY AND PHARMACY.

Asst. Surg. E. W. BROWN and Pharmacist O. G. RUGE, U. S. Navy.

ROWNTREE, L. G., and GERACHTY, J. T. **An experimental and clinical study of the functional activity of the kidneys by means of phenolsulphonaphthalein.** Jour. Pharmacology and Experimental Physiology, vol. 1, No. 6, July, 1910.

This investigation was undertaken "to determine if phenolsulphonaphthalein is better adapted for use as a functional test of the kidney than the other substances already in use for the same purpose," and was carried out at the pharmacological laboratory of the Johns Hopkins University and the genito-urinary polyclinic of the Johns Hopkins Hospital.

The functions of the kidney in health and disease and the requirements for an ideal functional test are briefly referred to: .

It is pointed out that our present knowledge of the method and efficiency with which the kidney performs its functions depends upon the examination and estimation of certain phenomena recognized as connected therewith, and that the exact nature of the processes involved is not yet a matter of actual conclusive demonstration. The estimation of the work done by the kidney includes a consideration of filtration, osmosis, selective absorption, synthesis of hippuric acid, and a control over nitrogenous metabolism by means of an internal secretion. Though the amount of work done by each kidney separately differs if observations are maintained for only short periods of time, yet in the course of ten to twelve hours both kidneys do practically the same amount of work.

It is recognized that disease is accompanied with changes in kidney function, and that the routine chemical and microscopical examination of the urine considered together with the case, history, symptom-complex, and physical examination will, in the majority of cases, lead to the recognition of the disease. But to indicate the exact nature, extent, and severity of the pathological process would require quantitative metabolic studies beyond the time, facilities, and training of the average physician. Hence the need for other and simpler methods of investigating the functional activity and efficiency of the kidneys.

The ideal functional test *must be used not alone but only in conjunction with and in relation to a thorough clinical investigation of the patient's condition*. It should indicate a constant amount of work for normal kidneys under normal conditions, a constant variation for constant abnormal conditions, functional alterations independent of histological appearance where such conditions exist, and the absolute work accomplished with its relation to the normal standard. It should be capable of indicating not only the work done under normal conditions, but also the latent force with which the kidney responds to an extra strain. It should be applicable with as simple technique as possible, without injury to the patient or extra strain upon the kidney itself. It should be mathematically correct and its results easy of interpretation.

Some of the more important functional tests already in use are reviewed:

Cryoscopy is considered the most accurate way of estimating the total solids excreted, but it is influenced by so many factors, for instance, diet, water intake, polyuria, precipitation of urates at the freezing point, etc., that serious error is possible, and the freezing point of even normal urine varies between 1.30° and 2.20° C. Comparative cryoscopy of the blood and urine has proven of more value, since the molecular concentration of the blood in health, 0.56, is about constant.

The electrical conductivity is a measure of the salts present in the urine, but the apparatus is expensive and skill and training are necessary to make accurate readings.

The methylene blue, indigo-carmin, and rosaniline tests consist in the administration of the dye and subsequent examination of the urine. The points to be noted are—

1. The time of appearance of the dye in the urine.
2. The time of maximum intensity of the excretion.
3. The time required for the total elimination of the drug.

In diseases of the kidneys 1 and 2 are delayed and 3 much prolonged. The defects of these tests are: In some diseases of the kidney, as parenchymatous nephritis, excretion is not delayed; the urinary pigments mask the color of the dyes; only part of the dose given appears in the urine.

The phloridzin test depends upon the production of glycosuria, unaccompanied by hyperglycemia. In renal disease the glycosuria is either entirely absent or delayed and the amount eliminated decreases.

The application of phenolsulphone-phthalein to tests relating to the physiology of the kidneys was suggested by the researches of Abel and Rowntree upon the phthalein family. In the elimination of various phthaleins by the kidney this one stood out in striking contrast.

This substance is a bright red crystalline powder somewhat soluble in water, more so in alcohol, insoluble in ether; its dilute alkaline solution is of a purer red than that of phenolphthalein, while a more strongly alkaline solution is purple. It is readily soluble in solutions of sodium carbonate and has a stronger avidity as an acid than phenolphthalein.

The drug can be administered by mouth without any untoward effects, and its sodium salt can be injected under the skin without any irritant result. All the evidence at hand indicates that it is devoid of toxicity. When given *by mouth* it appears in the urine in one to one and a half hours, and the *subcutaneous administration* is followed by the appearance of the drug in the urine within ten minutes.

The solution used by Rowntree and Geraghty in their investigations is obtained as follows:

Six-tenths of a gram of phenolsulphone-phthalein and 0.84 c. c. of 2/N NaOH solution are added to 0.75 per cent NaCl solution. This gives the mono sodium or acid salt, which is red in color and which is slightly irritant locally when injected. It is necessary, therefore, to add two or three drops more of the 2/N hydroxide, a quantity sufficient to change the color to a beautiful Bordeaux red. This preparation is nonirritant.

The technique of the test is given as follows:

In order to obtain data of real value it is essential to any functional test to know not only the time of appearance of the drug in the urine, but to know exactly what part of the drug, a known amount of which has been administered, is recovered in a definite time.

Twenty minutes to half an hour before administering the test the patient is given 300 to 400 c. c. of water in order to insure a free urinary secretion, otherwise delayed time of appearance may be due to lack of secretion.

Under aseptic precautions a catheter is introduced into the bladder and the bladder completely emptied. Noting the time, 1 c. c. of the carefully prepared solution of the phenolsulphone-phthalein containing 6 mg. to the cubic centimeter is administered subcutaneously in the upper arm by means of an accurately graduated syringe. (We have used the Record 2 c. c. syringe, which is graduated in fifths of a cubic centimeter.) It is our custom to draw the solution to the second division above the first cubic centimeter mark and then to expel the contents until the plunger is on a level with the division above the cubic centimeter mark and then inject accurately 1 c. c. This avoids any possible error which might occur as the result of the presence of an air bubble.

The urine is allowed to drain into a test tube in which has been placed a drop of 25 per cent NaOH solution and the time of the appearance of the first faint pinkish tinge is noted.

In patients without urinary obstruction the catheter is withdrawn at the time of the appearance of the drug in the urine, and the patient is instructed to void into a receptacle at the end of an hour and into a second receptacle at the end of the second hour.

A rough estimate of the time of appearance can be made by having the patient void urine at frequent intervals without the use of a catheter. In prostate cases it is wise to have the catheter in place until the end of the observation. The catheter is corked at the time of the appearance of the drug in the urine, and the cork is removed at the end of the first hour and at the

end of the second hour, each time the bladder being thoroughly drained. On many of the patients of this type on whom our observations have been made a retention catheter has been in use as part of the routine treatment on account of the residual urines.

Each sample of urine is measured and the specific gravity taken. Sufficient NaOH (25 per cent) is added to make the urine decidedly alkaline, in order to elicit the maximum color. The color shown in the acid urine is yellow or orange, and this immediately gives place to a brilliant purple red color when the solution becomes alkaline. This solution is now placed in a liter measuring flask and distilled water added to make accurately 1 liter. The solution is then thoroughly mixed and a small filtered portion taken to compare with the standard, which is used for all these estimations.

The standard solution used for comparison consists of 3 mg. of phenolsulphonaphthalein (or 0.5 c. c. of the solution used for injection) diluted to 1 liter and made alkaline by the addition of only one or two drops of 25 per cent NaOH solution. This is a beautiful purplish red solution, retaining its intensity of color for weeks or for an indefinite period.

The colorimetric test is made by taking a column of this standard liquid and manipulating a column of the urine product until both columns, looked at vertically, present an identical intensity of color. Then the quantity of dye in the urine column is to the known quantity in the standard in inverse ratio of the heights of the two columns. By the use of the Duboscq colorimeter it is claimed that it is possible to detect a difference of 0.04 mg. of phenolsulphonaphthalein by this method.

A series of normal cases were first studied to establish a standard. It was found that in normal cases the drug appears in the urine in from five to ten minutes, and 40 to 60 per cent of the 6 mg. dose is recovered in the first hour and from 15 to 25 per cent in the second hour, making the total recovery for two hours 61 to 85 per cent. The elimination for a definite period is considered as of more value than the total time of elimination.

Then a series of abnormal cases were studied, over 200 functional tests being performed on 150 different subjects. The tabulated results are given, and also many case histories in detail. These cases included acute nephritis, parenchymatous nephritis, interstitial nephritis, arteriosclerotic nephritis, tuberculosis of kidneys and bladder, diabetes mellitus, diabetes insipidus, albuminuria, hypertrophy of prostate, carcinoma of prostate, contracted bladder, calculus of kidney, pyelitis, pyelonephritis, and pyonephrosis.

In ten cases of chronic interstitial nephritis the amount of dye excreted was reduced in direct proportion to the severity of the case; in cases clinically recognized as grave the reduction was marked. In a case of scarlet fever complicated with nephritis and angina grave toxemia existed, and it was impossible to determine whether the toxemia was due to the nephritis or to the angina. A phthalein test showed the kidneys to be normal, and the nephritis completely cleared

up in a few weeks. It is claimed that this phthalein test will prove of great value in differentiating true nephritis from obscure conditions clinically resembling it and in estimating the amount of renal destruction in the chronic interstitial form.

In diabetes mellitus no deviation from normal was found. In diabetes insipidus a slightly decreased excretion was noticed.

In hypertrophy of the prostate and obstruction of the lower urinary tract this test affords a valuable index of renal conditions and indicates whether it is advisable to delay operation and proceed on a course of preliminary treatment. The development of uremia following operations on the prostate is cited as the greatest factor in causing mortality in this type of case. Obstructions in the lower urinary tract may infect the kidney and the patient may be on the verge of renal failure, which operative interference would precipitate. This grave renal condition has often escaped attention when the patient was examined by the ordinary clinical methods, but has revealed itself to the phthalein test. In general, it was found that with cases of obstruction of short duration and small amount of residual urine the excretion of the dye was almost normal. But in cases of long standing with large residual urine and not leading a regular catheter life there was a marked retardation in the time of appearance and a decided decrease in the excretion of the drug, thus contraindicating immediate operation.

In estimating the functions of the kidneys separately the inaccuracy of the urea and other tests have necessitated the introduction of functional tests in conjunction with ureteral catheterization. A 6 mg. dose is given subcutaneously and the time of injection, time of first appearance on each side, and the excretion for one hour are recorded. When one kidney only is diseased, the time of appearance of the drug is delayed on the diseased side and the amount excreted is not only relatively but absolutely decreased.

The chief advantages claimed for phenolsulphonephthalein are:

1. The complete elimination of the drug by the kidneys, its chemical nature being unchanged.
2. The early appearance of the drug in the urine following its administration.
3. The rapid excretion of the drug by the kidneys necessitating observation over only a short time—one or two hours.
4. The brilliancy of color which is imparted to alkaline urine and which is not readily influenced by the coloring matter of the urine itself.
5. The facility with which this drug lends itself to colorimetric methods, making accurate quantitative estimations possible.
6. The simplicity of the technique for quantitative estimation.
7. The absolute nontoxicity of the drug.
8. The nonirritant nature of the drug locally.
9. The extreme smallness of the dose required and the assurance this gives of there being no extra strain placed upon the kidney during the test.

CONCLUSIONS.

1. Functional tests considered in conjunction with a careful clinical study of the patient undoubtedly furnish information of decided value regarding the functional capacity of the kidney.

2. The phenolsulphonephthalein test as used by us has many advantages over all other functional tests so far proposed.

3. Phenolsulphonephthalein itself is better adapted for use as a functional test than any other drug previously employed for the same purpose on account of its early appearance in the urine and the rapidity and completeness of elimination by the kidney.

4. The method of quantitative estimation of the amount of drug excreted is simple and exceedingly accurate.

5. The permeability of the kidney for this drug is decreased in both chronic parenchymatous and chronic interstitial nephritis, the decrease being most marked in the interstitial variety.

6. The test has proven of great practical value in revealing the true renal condition in cases with prostatic obstruction. It is here of more value than the urinary output, total solids, urea, or total nitrogen, and enables the surgeon to select a time for operation when the kidneys are in good functional condition.

7. The improvement in cases of prostatic obstruction following the institution of preliminary treatment is strikingly demonstrated by this test and the time most suitable for operation is indicated.

8. In unilateral and bilateral kidney diseases the absolute amount of work done by each kidney as well as the relative proportion can be determined when the urines are obtained separately.—(HOSPITAL STEWARD F. L. LETTS.)

HATCHER, R. A., and BRODY, J. G. **The Biological Standardization of Drugs.**
Am. Jour. Pharmacy, August, 1910.

Believing that progressive pharmacists must be prepared to make simple biological tests of the more important drugs, and recognizing that it is a matter of vital importance to find a standard for all the digitalis bodies in which the relative activity on the human heart of the different members of this group may be expressed, the authors here outline a method of procedure upon which they have been working, confining themselves in this paper to the digitalis group before mentioned.

Their method is unique in that the frog unit, the one usually established, is superseded by the cat unit, which unit they define as the amount of crystalline ouabin (strophanthin), which is fatal, within about ninety minutes to a kilogram of cat when the drug is injected slowly and almost continuously into the femoral vein. A cat unit

has been found by them to be almost precisely 0.1 mgm. of crystalline ouabin, or one ten-millionth of the weight of the animal. The procedure is modified for some of the other digitalis bodies, as more accurate results are claimed; this latter procedure consists in injecting a measured amount of the digitalis body in the first period of about ten minutes and then substituting a solution of crystalline ouabin until the death of the animal. The difference between the amount of crystalline ouabin actually used to complete the assay and 0.1 mgm. per kilogram of animal represents the activity of the digitalis used. Remarkable accuracy is claimed, and their experiments lead the authors to believe that the cat affords a simple method of standardizing the digitalis group of drugs.—(O. G. R.)

DENIGES, G. The detection of methyl alcohol, especially in the presence of ethyl alcohol. *Compt. Rend.* vol. 150, p. 832.

The test here proposed appears to offer unusual advantages in simplicity of technique and delicacy of reaction. The author claims that a few milligrams may be detected in 100 c. c. of ethyl alcohol.

Principle.—Methyl alcohol yields formaldehyde on oxidation with potassium permanganate. Fuchsin bisulphite, which is fuchsin decolorized with SO_2 , shows a violet coloration with formaldehyde, but none with any other aldehydes, such as acetaldehyde from ethyl alcohol.

Technique.—One-tenth c. c. of the solution for examination in a test tube is thoroughly shaken with 5 c. c. of 1 per cent potassium permanganate and 0.2 c. c. of pure sulphuric acid. After two to three minutes 1 c. c. of 8 per cent oxalic acid is added, the mixture is again well shaken and left to stand until it bears a yellowish tint. One c. c. of pure sulphuric acid is now added and the fluid again agitated. When completely decolorized, 5 c. c. of fuchsin bisulphite are immediately added; a violet coloration develops in positive cases and reaches its maximum in about fifteen minutes. The presence of ethyl alcohol actually increases the efficiency of the test, and in the examination of nonalcoholic solutions this should be added.—(E. W. B.)

KAPELLAR, H. A simple method for the rapid and accurate determination of the alcoholic content of fluids. *Öst.-ung. Zeitschr. f. Zuckerind. u. Landw.*, vol. 38, p. 817.

The principle of the method: The boundary zone between aqueous fluids and ether disappears after the addition of a definite amount of alcohol.

Technique.—20 c. c. of the fluid to be tested are strongly shaken with 10 c. c. of ether and allowed to stand; 98 per cent alcohol is now added. The burette reading at this point is taken, a table consulted, and the percentage of alcohol immediately ascertained.—(E. W. B.)

BOYCOTT, A. E., M. A., D. M., and CHISOLM, R. A., M. A., B. M. A method for determining the alkalinity of the blood. *Bio-chem. Jour.*, Feb. 16, 1910, p. 23.

Methods commonly used to determine the end point require the use of colored indicators, dimethylamidoazobenzol and the like; these indicators, however, do not give a sharp end point with solutions of proteid, and the tint of the end point varies with the amount of proteid in solution. A trained observer may obtain fairly accurate results using colored indicators, but the average may obtain more satisfactory results making use of the method introduced by the authors of determining the alkalinity of blood by a flocculent precipitate reaction. The method of handling the blood to overcome any error due to the increase of a size of a drop of blood as coagulation approaches is described in detail. A brief outline of the method follows: A definite quantity of blood (about 0.02 c. c.) is introduced into each one of a series of test tubes, increasing quantities of N/1000 H_2SO_4 , commencing with 0.1 c. c., is introduced into each tube, and volume of liquid in each made up to 2 c. c. When compared with the control tube which contains no acid, an increase in opalescence, depending upon the amount of acid in tube, is noticed. The end point is indicated by the first tube showing precipitate, although the authors "are accustomed to take as the actual end point the point halfway between the last tube which does not and the first tube which does show a precipitate." The result may be expressed as c. c. of N/10 acid required to produce a precipitate in 100 c. c. of blood. Standard time and temperature is one hour at 45°. At lower temperatures the precipitate is not so well marked and takes longer to appear.—(HOSPITAL STEWARD CHARLES SCHAFER.)

DE JAGER. Contributions to clinical methods for urinary analysis. *Zeit. f. physiol. Chem.*, Bd. LXII, H. 4.

The author calls attention to (1) the fallacy which he has sometimes met with in the heat test for albumin, and (2) proposes a process for the separate estimation of ammonia and amido-acids by the formalin method.

(1) Urines which are alkaline in reaction and contain a large quantity of calcium phosphate and albumin may remain clear on

boiling and acidifying with acetic acid. He considers that an acid calcium phosphate is formed and an excess of phosphoric acid; the latter combines to form acid albumin, not precipitable on boiling with acetic acid. He finds that preliminary removal of calcium with potassium oxalate prevents this confusion. To 10 c. c. of urine is added 1 c. c. of 10 per cent potassium oxalate, and the mixture allowed to stand. The clear filtrate is tested in the usual way by boiling and acidifying.

(2) Total ammonia plus amido-acids are determined by the usual formalin method and the combined result recorded; 20 c. c. of the urine are now taken and treated with 5 c. c. of primary magnesium phosphate, equivalent to 20 c. c. of $N/10$ NaOH. A slight excess of $N/10$ NaOH is now added in the presence of phenolphthalein, and then it is made exactly neutral with $N/10$ HCl. It is assumed that the total ammonia has been removed in the form of ammonio-magnesium phosphate. Titration is now carried out with $N/10$ NaOH in the presence of formalin. The burette reading gives the figure for calculation of the amido-acids, and by subtraction from the combined result the quantity of ammonia is obtained.

The author recommends the addition of a few drops of very dilute methyl green along with the phenolphthalein. He claims that this sharpens the end reaction in a striking manner.—(E. W. B.)

RONA, P., and OTTENBURG, R. **A method for the estimation of nitrogen in the urine.** *Biochem. Zeit.*, vol. 24, p. 354, 1910.

The principles of the method here described were published in a recent paper in the *Bulletin*^a and later abstracted in "Chemical Abstracts." This previous publication of a similar process is not referred to by the authors.

The technique is sufficiently simple to be adapted to clinical purposes. The ammonia produced by digestion with acid in the Kjeldahl determination is estimated by the formalin process.

Technique.—Five c. c. of urine are boiled with 10 c. c. H_2SO_4 and 5 to 8 drops of a 1 per cent H_2PtCl_6 solution until colorless. The solution is diluted with 100 c. c. distilled water plus 6 or 7 drops of litmus solution and then slowly neutralized with 33 per cent NaOH. The change between blue and violet is taken as the end point. The mixture is then made slightly acid, or neutral, with $N/5$ acid, and then $N/5$ alkali added until distinctly blue. The $N/5$ acid is again added until the end color just passes the violet stage. Now 30 c. c. of neutral formalin solution are added and titration carried

^a E. W. Brown, *U. S. Naval Medical Bulletin*, 1910, vol. 4, No. 1, p. 69.

out with $N/5$ NaOH until a blue color results. One c. c. of $\frac{1}{2}$ per cent phenolphthalein is introduced and titration continued until the violet color begins to appear. The last burette reading corresponds to the number of c. c. of $N/5$ NH_3 in 5 c. c. of urine.—(E. W. B.)

BARDACH. A method for the direct test for acetone in the urine. *Zeltschr. f. analyt. Chem.*, 1910, Bd. 49, p. 103.

The chief advantage of the proposed test is the avoidance of the usual preliminary distillation. The directions are as follows:

Three c. c. of filtered urine are treated with 1 per cent of pure 3 per cent peptone (Grubler's or Merck's) solution, the mixture well shaken, and Lugol's solution added in such quantity (1 to 5 c. c.) that on the addition of 2 c. c. of ammonia a dark color shall appear, lasting for at least ten minutes. Care, however, should be taken not to add too great an excess of the iodine solution. After standing for about an hour and a half the mixture is acidified with hydrochloric acid. If it remains clear, acetone is not present. If positive, a precipitate forms, made up of a deposit of iodoform crystals, readily identified under the microscope. The reaction is very delicate, readily detecting 0.01 per cent acetone in the urine. Furthermore, it is also applicable to other body fluids; the only necessary preliminary is filtration. Urinary albumin, pigment, sugar, blood, bile, oxalate, and even alcohol do not interfere with the test.—(E. W. B.)

REHFUSS, M. E., and HAWK, P. B. A study of Nylander's reaction. *Jour. of Biol. Chem.*, vol. 7, No. 4, Mar., 1910, pp. 273-287.

So many conflicting claims as to the value of this test have come from various sources in recent years that the authors have made a careful study of it from five different standpoints: (a) Most satisfactory method of technique—5 c. c. of the protein-free urine are placed in a test tube. 0.5 c. c. of Nylander's reagent is added, and the tube placed in a boiling water bath for five minutes. They use a large porcelain-lined water bath, the bottom of which forms an excellent background for observing the black end reaction. (b) The delicacy of the test—This was found to be 0.08 per cent. (c) The effect of temperature—The duration of the test varies directly with the heat. From 74° C. to the boiling point appears most satisfactory; the five-minute period within these limits is sufficient. (d) Interfering substances—Albumin gives a deep amber, cherry, or brown, but an actual black color never results. Tyrosin and leucin delayed the reaction, but the typical end product was finally obtained. Cholesterol and cystin did not influence it. Excessive amount of urea, uric acid, sodium urate, potassium urate, creatinin, and phosphates did not affect the reaction, while the first four named are well known to affect

the copper tests when present in excessive amounts. (*e*) Clinical value—The experience of the authors with Nylander's in comparison with other well-known sugar tests confirm them in the opinion that it is of decided clinical value. In the examination of over 700 urines, there were only two cases in which Nylander's reaction was positive and Fehling's test negative. It may safely be said that any protein-free urine of acid reaction which gives a negative Nylander's test is sugar free in a clinical sense.

Tests were also tried in the presence of several acids, the greater number of which are regularly used internally or externally, either as such or in the form of some derivative, i. e., acetic, trichloracetic, tannic, boric, tartaric, picric, carbolic, arsenious, benzoic, salicylic, chromic, and pyrogalllic. Only three, i. e., trichloracetic, chromic, and pyrogalllic, exerted any inhibitory action upon the Nylander's test. With the last named the color was red-brown, whether the urine was sugar free or contained reducing carbohydrate.—(E. W. B.)

BOOS and HARMER. The so-called "Cambridge test." Boston Med. and Surg. Jour., June 16, 1910, p. 821.

Boos and Harmer make a preliminary note of some observations bearing on the specificity of the Cambridge reaction. The work confirmed the authors' suspicion of the association of leucocytosis with a positive Cambridge reaction. The cases were divided into three groups:

All cases in Group I, 33 in number, showed a positive test and, with three exceptions, had white counts of over 17,000. These cases included various diseases, but in only one was there a possibility of pancreatic involvement.

Group II included 4 positive cases having white counts of less than 9,000.

Group III represents 6 cases in which unsuccessful attempts were made to get a positive reaction from empyema pus, blood, or pericardial fluid.

This work does not dispute the fact that the Cambridge body may be found in cases with pancreatic involvement, but shows that it may be found in a variety of other conditions. We have not failed to secure a positive test in any case with a white count of 13,500 or over, whether neutrophiles, basophiles, or myelocytes, and have secured positive tests in a few cases with white counts under 9,000.

[Cambridge, on May 24, before the Royal Society of Medicine, presented two papers, one on the "Results of the pancreatic reaction in 1,475 cases," the other on the diagnostic value of an analysis of the

excreta in disease of the pancreas. He did not claim that the reaction that bears his name was pathognomonic, but he did assert that it strongly suggested active degenerative changes in the pancreas, and, in conjunction with history, symptoms, and examination of the feces, was of great value.]—PASSED ASST. SURG. H. W. SMITH.

TSUCHIYA, J. The occurrence of and a clinical test for soluble protein in the feces. *Zelt. f. exp. Pathol. u. Therap.*, vol. 5, h. 3.

The author proposes an ingeniously simple test, which he considers will be of value in the diagnosis of certain gastric and intestinal affections.

About 5 grams of well-ground feces are rubbed up with water to a thin consistency; 10 c. c. of this preparation are placed in a small mortar, made acid with 10 per cent acetic acid, and thoroughly macerated. This procedure precipitates neucloproteid. Five c. c. of chloroform are now added and the material again well rubbed up to remove the bulk of soluble coloring matter. The mixture is then transferred to a cylinder and allowed to stand until the larger particles and chloroform have settled out. The supernatant portion, which is slightly yellow and finely turbid, is decanted; a section of agar impregnated with copper sulphate is placed therein for an hour. The agar is then well washed with water, put in a glass dish on a white background, and covered with dilute sodium hydroxide. In positive cases, a beautiful biuret reaction develops in a few minutes.

The clinical importance of the process is emphasized by the author. If the feces were well formed, no protein could be demonstrated, whether in normal cases or disorders of the stomach or intestines. In 23 cases of fermentative dyspepsia of the latter, protein was found in one case only, and this was persistently chronic. It was found regularly in all cases of diarrhea with indications of inflammatory change; never in purely functional diarrhea. In the author's opinion, therefore, dissolved protein always has its origin in transuded serum, which means an organic disorder, and never in the protein of the food.— (E. W. B.)

GROSS, O. A test of pancreatic function. *Arch. f. exp. Path. u. Pharm.*, 58, S. 137.

The test here described is of unusual interest and has recently received much favorable comment from German clinicians who have reported on its diagnostic value. The method is designed to show the presence or absence of trypsin in the stools and the approximate quantity when present; thus yielding an important indication as to pancreatic function. A constant test meal is prescribed. The principle of the method is as follows:

Casein in alkaline solution is readily precipitated by acetic acid; its products of tryptic action, however, are not separated. Under conditions of a fixed quantity of casein, the strength of the trypsin in the solution under examination is determined by the time necessary for precipitation to disappear with acetic acid; or from the grade of dilution required for the solution to remain clear after digestion for a fixed period of time. • Gross considers that the results give a fair idea as to the secretory activity of the pancreas.

The patient is given a test breakfast, consisting of scraped meat and white bread and butter. Two hours later he receives a liberal dose of Carlsbad salts. The resulting thin stool is diluted ten times, filtered, chloroform added to inhibit bacterial action, and 10 c. c. taken for the trypsin test.—(E. W. B.)

PATHOLOGY AND BACTERIOLOGY.

Passed Asst. Surgs. O. J. MINK and F. M. SHOOK, U. S. Navy.

ANDERSON, J. F., U. S. P. H. and M. H. S. **Anaphylaxis and its relation to clinical medicine.** (Read before the Johns Hopkins Hospital Medical Society, March 7, 1910.)

In most of his work on anaphylaxis up to this time, the author has been associated with Rosenau and his remarks are based largely on their joint work.

The earliest experimental work on the subject was that of Richet, who coined the word "anaphylaxis." He considered the condition as an opposite one to that of prophylaxis; it is now known that the phenomenon is probably an important step in the protection of the organism against a certain large class of infections.

The condition of anaphylaxis may be transmitted from the mother or may be acquired, and it may be brought about by the introduction of any strange protein into the body. A well-known clinical instance of anaphylaxis is that induced in an individual of a second vaccination. In the reaction to a primary vaccination, the incubation period is about four days, i. e., in about four days local symptoms at the point of vaccination appear or become distinctive and there is more or less constitutional disturbance. In a secondary vaccination following a successful vaccination after some months, the period of incubation is much shorter and the clinical action very much lessened. This acquired power of immediate response is an evidence that protective bodies have been formed within the organism, but there is no absolute immunity in this class of infection.

Other well-known clinical instances of anaphylaxis are the tuberculin and mallein reactions in tuberculosis and glanders. Many workers have found that the blood serum of an animal of one species

is frequently poisonous when injected into an animal of another species, but that the serum of the horse or donkey to a large extent lacks such poisonous properties. In a certain proportion of cases, however, injection of horse serum into man is followed by the syndrome described and named by von Pirquet as the "serum disease."

Horse serum when injected into guinea pigs is a comparatively bland and innocuous substance, but these animals may be rendered so sensitive that a second injection of horse serum may produce death, or at least very severe symptoms.

The first injection of the foreign protein has so changed the mechanism of the animal's organism as to render it very susceptible to the second injection.

As the first experimental work with anaphylaxis was done with horse serum, it was thought that diphtheria antitoxin had some part in this toxic action of the serum, but as it was soon found that the phenomenon could be produced by any protein, it was seen that diphtheria antitoxin had absolutely no part in the production of the phenomenon.

The toxic action following the injection of the serum is due to a protein in the horse serum and is entirely independent of the antitoxic properties of the serum. It would be exceedingly unfortunate if the studies of anaphylaxis should in any way prevent the usage of diphtheria antitoxin or any other therapeutic serum where it is indicated.

Most of the studies on anaphylaxis have been done upon guinea pigs. It is interesting to note that in some instances the heart beat has been noted as long as thirty minutes after complete stoppage of respiration. Death is apparently due to asphyxia. At least a certain time must elapse before the first and the second injections of the protein before the anaphylaxis is manifested; this period of incubation is from seven to eleven days. The optimum period for the development of anaphylaxis is after three weeks. A second injection at any time during period of incubation does not bring about ill results, for there has not been time for the body to become sensitive to the second injection. If the second injection be given after the twelfth day the result is usually fatal. There appears to be no difference whether the sensitizing injection be given subcutaneously, intraperitoneally, into brain or circulation, or whether the intoxicating dose be given through the same or different channels. It is the author's opinion that the same portion of the protein which sensitizes the guinea pig is the same as that which later poisons it.

Heat modifies or destroys the anaphylactic properties of proteins by rendering the proteins insoluble rather than producing chemical changes in them. Neither sensitizing nor toxic principles in proteins

are affected by various substances, nor by freezing, filtering through porcelain, precipitation and dialysis, or exposure to X rays.

The use of atropin seems to have a favorable influence upon the outcome of anaphylaxis when given a short time previous to the intoxicating injection; also by injection of chloral hydrate plus urethane and adrenalin by administering pure oxygen along with chloral hydrate and adrenalin. Almost invariably life was prolonged, the pigs eventually dying from low blood pressure and not acute asphyxia.

The author cites instances in connection with the specificity of the reaction. Guinea pigs may be sensitized by feeding them a protein for several days. When tested for their susceptibility after fourteen days by an injection of the protein they are found to be sensitive.

The young of a female guinea pig which had received an injection of horse serum, either before or after conception, were acutely sensitive to an injection of the same protein. This transmitted sensitiveness is solely maternal.

By a number of exchange experiments milk has been excluded as a factor in this transmitted susceptibility.

These experiments upon transmission of anaphylaxis by the female to her young are of very great interest in relation to the question of an inherited tendency to tuberculosis. Rarely is the child born with the seeds of the disease in its system, but there is transmitted from the mother to the offspring a tendency to the disease.

Individual sensitization plays a more important part than so-called toxicity of the serum used. Many of the cases of sudden death following the first injection of serum in man have been asthmatics or in persons who have an idiosyncrasy to horses. The knowledge of the fact that the injection of horse serum into such persons is a danger must certainly be taken into consideration in the use of antitoxin.

Anaphylaxis having been produced by various proteins early suggested the possibility of the production of anaphylaxis by bacterial extracts. The author is of the firm opinion that the phenomenon of anaphylaxis has an important relation to the prevention and cure of certain specific processes and that resistance to certain diseases is largely gained through the processes of hypersusceptibility, and this opinion is certainly strengthened by the immunity which follows a hypersusceptibility developed by bacterial extracts.

It is very evident from the above rather incomplete review of the subject of anaphylaxis that studies upon this phenomenon are of more than theoretical interest and value, and that a satisfactory explanation of the mechanism of anaphylaxis will give us a clearer insight into the cause of recurrence and resistance to a certain class of diseases.—(HOSPITAL STEWARD A. H. EBERLING.)

SEWAKI, H. M. R. C. S., L. R. C. P. On the preparation of a simple culture medium. *Sei-I-Kwai Med. Jour.*, Vol. XXIX, No. 5. Tokyo, May 31, 1910.

The ordinary bouillon and agar culture media are most frequently used for the cultivation of bacteria, and it will be a great advantage if one can simplify the preparation of media so that they can be prepared in out-of-the-way places.

The medium that Sewaki recommends is:

Shoyu bouillon:

Shoyu ^a	-----grams--	15
Petone	-----do----	18
Water	-----c. c--	1,000

Mix the above ingredients and neutralize it with a saturated solution of sodium carbonate. After boiling it for twenty to thirty minutes filter it, and if the reaction is acid neutralize the mixture. The sterilization is done in a steam sterilizer.

Simple shoyu-culture medium.—Mix 20 grams with 1,000 c. c. of water, and after the neutralization boil and filter; put in test tube and sterilize as in above medium.

Shoyu-agar medium.—To 1,000 grams neutral shoyu medium add 18 grams of agar, and boil the mixture for one-half hour; make the reaction neutral, and cool down to 60° C., add the white of three or four eggs, mix thoroughly, and after boiling it for one hour filter and put in test tube and sterilize in steam sterilizer.

Shoyu medium after Endo's method.—Instead of bouillon and sodium chloride, 15 grams of shoyu to 1,000 c. c. of water are employed.

Shoyu medium after Conradi-Drigalski method.—For 1 pound of meat and 5 grams of sodium chloride are substituted 15 grams of shoyu to 1,000 c. c. of the liquid.

The characteristics of the shoyu media are:

1. Shoyu medium does not contain meat in any form.
2. Shoyu is employed in the place of meat.
3. As shoyu contains sodium chloride, the latter is not employed.
4. The shoyu-culture media can be used instead of the usual culture media in bacteriological examinations for typhoid, paratyphoid, and dysentery bacilli. The author has found no disadvantages in their employment. The reason why bacteria grow well on shoyu-culture media is that the shoyu contains proteids not coagulated by heat and some sodium chloride. The selection of shoyu is not very important as long as it does not contain salicylic or boric acid.—(HOSP. APP. (1ST CLASS) C. W. ELYEA.)

^a This shoyu is a Japanese sauce which is used quite extensively on the Pacific coast and on ships having Japanese mess attendants. It is cheap and might, upon certain occasions, be of service in the preparation of the media indicated.—(C. S. B.)

LAWRASON BROWN, M. D., and DANIEL SMITH (Adirondack Cottage Sanitarium, Saranac Lake, N. Y. The cultivation of the tubercle bacilli directly from the sputum by means of antiformin. Jour. of Med. Research, June, 1910, p. 517.

The authors report very successful results in obtaining pure cultures of tubercle bacilli directly from the sputum in nine or ten days. They describe their technique as follows:

Antiformin, first described by Uhlenhuth, consisting of equal parts of Javelle water and a 15 per cent watery solution of sodium hydrate, was used to dissolve the mucus and to destroy the secondary organisms. Equal parts of a 30 per cent solution of antiformin in water and sputum were thoroughly mixed in a sterile tube and allowed to stand at room temperature for one hour. The tube was then centrifugalized, the supernatant fluid decanted, and the sediment mixed with sterilized distilled water. This was again centrifugalized and the whole process was carried out three times. The sediment was then streaked over the surface of Dorset's egg medium and placed in the incubator. The medium, as employed by us, was prepared as follows: The shell of the egg was sterilized, the white and yolk thoroughly mixed, sterilized distilled water equal in amount to 25 per cent by volume was added, and after slanting in tubes, avoiding bubbles, it was coagulated in the ordinary blood serum coagulator by heating on three successive days to 85° C.—(F. M. S.)

WILSON, LOUIS B., M. D. The hospital laboratory, with special reference to diagnosis in surgical cases. St. Paul Med. Jour., May, 1910.

The author directs attention to the successful results attained in rapid diagnosis of tissue from the operating table by means of the freezing microtome. His technique is as follows:

1. Fresh tissue, the cells of which must be still alive (i. e., if not kept in the ice chest, not more than two hours out of the body), in bits not more than 2 by 10 by 10 mm., is frozen in dextrine solution on a good microtome and cut in sections 5 to 15 microns thick.

2. Remove the sections from the knife with the tip of the finger and allow them to thaw thereon, thus avoiding later development of air bubbles.

3. Unroll the sections with camel's hair brush in 1 per cent NaCl solution.

4. Stain 10 to 20 seconds in Unna's polychrome methylene blue, Grubler's.

5. Wash out momentarily in 1 per cent NaCl solution.

6. Mount in Brun's glucose medium. (See Lee's Vade Mecum.)

The Spencer automatic microtome with CO₂ attachment and vulcanite insulating plate gives excellent sections. Handle the sections from first salt solution through to the slide with a small glass rod lifter. Keep the sections constantly moving while in the stain. The smaller the stain cup the more readily tissue may be found in it if dropped from the lifter. If fluids for unstained sections are in clear glass over a black background, and those for stained sections are in white porcelain or clear glass over a white background, the work will be much facilitated. The various tissue elements are sharply contrasted in red, purple, and dark blue. Even mitotic figures, where present, are many times beautifully shown. The sections, of course, fade as they die and decompose. Formalydehyd-fixed material, first thoroughly washed in tap water, may be treated in exactly the same manner as fresh tissue. The color differentiation is materially different, but the process is of great convenience for the rapid examination of a great number of blocks from a given specimen.—(F. M. S.)

MOTT, F. W., M. D., Lond., F. R. C. P., Lond., F. R. S. **The cerebro-spinal fluid.**
The Lancet, July 9, 1910, pp. 79-80.

The author summarizes the normal and pathological properties of the cerebro-spinal fluid in the following tables:

TABLE I.—*Cerebro-spinal fluid in pathological conditions.*

Properties, substances, etc.	Normal.	Pathological.
Appearance	Clear, like water.....	Serous, turbid, purulent, fibrinous, yellow, red, brown.
Specific gravity	1.004-1.007.....	Increased.
Reaction	Alkaline.....	Alkaline.
Tension	60 drops per minute ..	Hypertension, hypotension.
Cryoscopy	-0.55°.....	Hyper hypo.
Permeability of subarachnoid space.	Nil.....	Variable and unstable.
Presence of drugs .....	.....	Occasional instances.
Toxicity.....	Nil.....	It does exist, but rare.
Virulence	do.....	Sometimes marked.
<i>Chemical alterations.</i>		
Proteins	Trace globulin. No albumin.	Excess globulin, albumin, nucleoprotein.
Lipoids.....	Nil.....	Cholesterol. Splitting products of lecithins and sphingomyelin.
Sugar.....	0.15-0.18 per cent.....	Excess in diabetes. Probable decrease in dementia præcox.
Urea.....	0.15 per cent	Excess in uremia.
Choline.....	Nil.....	Probable trace in acute nervous degeneration.
Chlorides.....	0.6-0.7 per cent	
Carbonates	0.13 per cent	
Potassium salts.....	0.03 per cent KCl	No appreciable alteration.

TABLE II.—*Abnormal conditions of the cerebro-spinal fluid.*

I. *Cytological examination.*—Normal fluid is practically free from cells. In pathological conditions an estimation is made of the type and number of cells.

II. *Bacteriological examination.*—

- (a) Staining the centrifuged deposit.
- (b) Cultural methods.
- (c) Inoculation.

III. *Protozoal examination.*—

- (a) Staining the centrifuged deposit.
- (b) Examination of a hanging drop.
- (c) Inoculation.

IV. *Biochemical.*

1. *Polynuclear leucocytosis* generally indicates microbial invasion of the subarachnoid space by some organism other than the tubercle bacillus; but polynuclear cytolysis may accompany lymphocytosis in a certain proportion of cases of tuberculous meningitis.

2. *Mononuclear leucocytosis.*—Whereas polynuclear leucocytosis points to an acute inflammatory affection of the meninges, mononuclear leucocytosis indicates a chronic condition. It occurs almost invariably in syphilis of the central nervous system, general paralysis, tabes dorsalis, tuberculous meningitis, and sleeping sickness. It has been found in other conditions e. g., herpes zoster, acute poliomyelitis, mumps, lymphatic leukaemia, chloroma, and some cases of cerebral tumour. Mononuclears may also replace the polymorphs in the later stages of microbial infection.

The most important organisms found are: Pneumococcus, streptococcus, bacillus tuberculosis, diplococcus intracellularis causing meningitis. Various other micro-organisms, together with pneumococcus, pneumo-bacillus streptococcus, and staphylococcus may, as a result of secondary or terminal infection, invade the subarachnoid space.

The only protozoon met with constantly in the disease which it causes is the *Tryp. gambiense*. Only once has the *Treponema pallidum* been found.

The Wassermann reaction of the blood serum combined with that of the cerebro-spinal fluid.

(F. M. S.)

MEDICAL ZOOLOGY.

Passed Asst. Surg. P. E. GARRISON, U. S. Navy.

WHYTE, G. DUNCAN, M. B., Ch. B., Edin. **Helminthic infection and its relation to eosinophilia. A study based on the examination of the feces of 562 cases and of the blood of 102 cases in south China.** *The Lancet*, London, July 30, 1910, pp. 297-301.

While the relation between infection with intestinal worms and eosinophilia has been generally accepted, the evidence in support of such a relation has not been entirely satisfactory, and it is generally recognized that the subject would bear further study as regards both the consistent occurrence of the phenomenon and the reasons underlying its production.

Whyte's paper is a valuable contribution to the subject in that his work was based upon a comparatively large number of cases, and his records include accessory data of great importance in interpreting the results. The chief difficulty was to obtain a sufficient number of control patients, since nearly the entire population is infected with one or more species of helminths. The method was adopted of comparing the eosinophile counts of patients having one, two, three, and four infections and those having light and heavy infections. The tables given will bear considerable careful study. The author summarized his conclusions as follows:

The more varieties of parasites that infest a man, and the more numerous the individuals of each variety, the greater degree of eosinophilia he is likely to show. This will be especially marked if he is between 20 and 40 years of age, and will be less noticeable if he is older or is suffering from some form of tuberculosis.—(P. E. G.)

JONES, PERCY L., Capt., Medical Corps, U. S. Army. **The ant as a destroyer of flies.** *Military Surgeon*, Washington, vol. 27, No. 1, July, 1910, pp. 77-82.

Commenting upon the scarcity of flies in a great part of the Philippine Islands, which has been noted by numerous observers, Jones relates certain experiments undertaken to determine the possible prevalence of some epidemic disease among flies accountable for their small numbers. In the course of experiments it was found that it was impossible to raise flies unless the eggs and larvæ (in manure) were protected from ants, as the latter invariably carried off both eggs and larvæ, and even pupæ.

The ants chiefly concerned appear to be of one peculiar outdoor species, which, according to Banks (Bureau of Science), has not been positively identified. Other species also, however, have been seen destroying fly larvæ. The author suggests the introduction of certain species of ants into other countries to prey on the flies.—(P. E. G.)

PATTERSON, HENRY S., M. D., New York. *Amebic dysentery in New York*. Medical Record, New York, May 14, 1910, pp. 835-836.

The author reports two cases of amebic dysentery evidently contracted in New York City. He refers to three cases previously reported by him and to records showing about fifteen other cases occurring in and about that city, and states that conversations with physicians indicate that there have been many unrecorded cases. No definite suggestion is offered as to the probable source of infection.—(P. E. G.)

TUTTLE, A. D., first lieutenant, Medical Corps, United States Army. *The Gastrodiscus hominis in the Philippines, etc.* Military Surgeon, vol. 26, No. 6, June, 1910, pp. 673-677.

Tuttle reports the first case of infection with this interstinal fluke in the Philippine Islands. The patient was a native Moro, who had always lived in the Cotabato Valley, Mindanao. Two adult worms were found. There was no evidence regarding the source of infection, though the author suggests that the occasional visits of itinerant Chinese and Indian peddlers might indicate the importation of the parasite.—(P. E. G.)

RUFFER, MARC ARMAND, M. D. *Note on the presence of Bilharzia hæmatobia in Egyptian mummies of the twentieth dynasty (1250-1000 B. C.).* British Med. Jour., January 1, 1910.

The author found ova of *Schistosoma hæmatobium* in the kidneys of two Egyptian mummies dating from over three thousand years ago. The diagnosis was confirmed by Professor Looss. He states further that the following conditions have been plainly recognized in pathological sections of various organs from mummies of this period: Atheroma, pneumonia, renal abscess, and cirrhosis of the liver.—(P. E. G.)

TROPICAL MEDICINE.

Surg. C. S. BUTLER, U. S. Navy.

WALKER, E. A. *Transmission of pest without rats and without fleas.* Indian Medical Gazette, XLV, No. 3 (translated from Bulletin Mensuel, Tome II, fascicule 6, p. 935).

The 25th of July, 1909, plague made its appearance in the villages of Kyankpin and Ywatha, district of Melktila. The first case was followed by two others appearing the 26th and 29th of July. Some dead rats were found, and among these some infected with plague. The disease had been imported

from Yamethin. The village was evacuated completely by the 3d of August, and the inhabitants, to the number of about 900, placed in camps.

It was thought that new cases, if any occurred, would appear among individuals infected previously to evacuation of the villages. However the 5th, 7th, 8th, and 12th of August a case appeared among those in camp; the 15th there was also a case; the 17th two cases; the 24th two cases. These cases appearing long after the normal incubation period were very discouraging; the author was lead to inquire if there was not some unknown factor involved in their production. Consequently on August 15 all belongings, including clothing, beds, and objects of all sorts, were examined by coolies to see if rats had accompanied the inhabitants from the village or if dead rats had been carried with the material brought along. In spite of a minute search no live or dead rat was found. The author then concluded that the cases of pest had occurred in the absence of rats. Some little embarrassed by this conclusion the 18th of August he placed the inhabitants in camps at distances of from 400 to 2,500 meters from the village. In spite of this measure a new case appeared on August 24. Of the nine cases appearing since the evacuation of the village seven were in families which had had a former case. All these cases, of which seven were mortal, were of the bubonic type, none showing pulmonary symptoms; infection by the sputum could thus be excluded. On the other hand, infection by contact was possible in 77 per cent of the cases.

The infection could then either be produced by the excretions of the sick or by the intermediation of some parasite.

Concerning the first hypothesis, it was thought that in view of the findings of the English Plague Commission in India the infecting power of the urine and feces in septicemic plague is of little consequence. On the other hand, there were no cases of pulmonic plague.

As to the second hypothesis, the author recalled the researches of Verjbitski, who showed that plague can be transmitted by other insects than the rat flea. On August 15 the author started to collect bedbugs from the clothes, beds, etc., of the inhabitants. All were *Cimex rotundatus*. The contained blood was examined for *B. pestis*. Of 24 specimens taken indiscriminately from infected or hitherto uninfected cases, 1 bedbug, or 4.14 per cent, was found infected; of specimens taken from only infected cases, 6 bedbugs, or 22.2 per cent, contained *B. pestis*.

These observations admit of an objection, i. e., they do not prove that the bacilli found in the intestinal tract of the bedbugs and only identified morphologically were really *B. pestis*. Owing to the difficulties of culture and in order to obtain a formal proof, the author made the following experiments:

On August 25, five bedbugs, obtained in a healthy village, were allowed to bite the arm of a patient who was taken sick on August 16. They were placed the next day to feed upon a healthy rat, which had been shaved, but they refused to bite because of the soap used in shaving the abdomen. The following day, however, when placed upon the abdomen of a rat they bit energetically. This rat died sixty hours later, and the spleen and liver showed great numbers of typical bacilli.

These epidemiological facts and experiments reported by the author, which we have given in detail, because such are not numerous in the literature of pest, confirm then very clearly the possibility of plague transmission by the common bedbug, an observation already made in 1908 by Verjbitski, but considered up till now to have only a theoretical value.

They show among other things that the conclusions of the English Plague Commission in India, affirming that the transmission of pest to man by the

rat flea and only by the rat flea, were too absolute, and that other insects, and particularly the bedbug, can constitute a factor of highest importance in the transmission of this affection.—(C. S. B.)

FRASER, HENRY, and STANTON, A. T. **The Etiology of Beriberi.** From the Institute for Medical Research. Knala Sumpur, Federated Malay States.

Observations previously made by the authors confirm the view that diet is the essential thing in the causation of beriberi. Braddon first pointed out the relationship between the consumption of rice and the disease beriberi. The mechanism by which rice produces the disease has remained obscure. Working upon the poison hypothesis, it was attempted to extract from white rice associated with attacks of beriberi a chemically recognizable poison. This attempt failed. These experiments pointed to nutritional defects, though previous investigation had shown this hypothesis inadequate, if dietary constituents alone were considered. A series of experiments upon fowls fed upon different kinds of rice showed that they were sensitive to differences between them. It was found that a certain reaction in fowls might be taken as an indicator of the beriberi-producing power of a given rice when forming the staple of the diet in man. Whether the neuritis produced in fowls is identical with beriberi does not affect the argument advanced. Rices were available that were known to have been associated with outbreaks of beriberi, and it was found that when they were fed to fowls they constantly produced a certain disease in a large proportion of them, while parboiled rice as constantly failed to reproduce it in groups under otherwise identical conditions. The disease manifests itself by paralysis of the legs followed by paralysis of the wings in the severer cases. It is the author's belief that this disease (*Polyneuritis gallinarum*) is identical with beriberi. In the Federated Malay States two types of rice are in common use, known respectively as Siam and Rangoon, and it is a fact that Siam is more potent in beriberi-producing powers than Rangoon. Proteins, carbohydrates, and fats were determined for the several types of rice, and the only marked difference was found to be in the fat content, which was abundant in Rangoon, less abundant in parboiled, and least abundant in Siam rice. These observations, taken with experimental work upon fowls, excluded the possibility of explaining beriberi on the ground of fat deficiency. By sectioning various rice grains and examining histologically, it was found that in parboiled rice remnants of the pericarp were found attached to the rice grain, whereas in Siam rice the pericarp and subpericarpal layers had been polished off. Parboiling toughens the pericarp so that it is less easily removed. The layers so retained in parboiled rice contained most of

the aleurone and oily material present in rice grains. The rice prepared by primitive methods also retains parts of the subpericarpal layers. Parboiled rice exhausted with hot alcohol and dried to free from alcohol will, when fed to fowls, produce the neuritis just as will white rice, although before exhaustion it is incapable of doing so. If it could be shown that a substance or substances in the outer layers, which were polished away from white rice but retained in parboiled rice, could be added to white rice, and so prevent its harmful effects, this result would support the nutritive hypothesis. Accordingly the following experiments were put through:

Experiment A.—Twelve fowls were fed on the husked grain for five weeks. *Result.*—All remained healthy.

Experiment B.—Twelve fowls were fed on the white rice alone. *Result.*—In five weeks six had developed polyneuritis; two were dead, one having suffered from polyneuritis and one from disease other than polyneuritis; five fowls remained healthy.

Experiment C.—Twelve fowls were fed daily on rice taken from the same bag as that used in Experiment B. In addition, polishings in the form of emulsion in amount equal to that milled from the quantity of rice consumed were fed daily by a tube passed into the crop. This quantity was subsequently diminished week by week until only 3 grams of polishings per kilo of body weight were being given daily. This amount sufficed to maintain the fowls in health and in constant weight. *Result.*—The experiment was continued for seven weeks and all remained healthy.

The result was subsequently confirmed for rice taken from places where known outbreaks of beriberi had occurred.

It will be understood that these three experiments were in progress simultaneously, and that the fowls were in all respects under identical conditions.

Experiment D.—Part of the original paddy was taken out and milled by a Malay woman by primitive methods into the finished product as eaten by Malays. Eight fowls, fed for five weeks on the rice prepared from the original paddy by the Malay method, remained healthy. Eight fowls only were used for this experiment, as the quantity of paddy then remaining sufficed only for this number for the time it was estimated the experiment would last.

Attention is drawn to the point that the products used in these experiments were all derived from the same lot of paddy, and the results force us to the conclusion that it is the polishing process which is essentially at fault; the polishing of white rice removes from the seed some substance or substances essential for the maintenance of the normal metabolism of nerve tissues.

The authors think probable that the higher content of phosphorus in unpolished rice is the reason fowls fed upon it do not develop neuritis. Fowls which receive only water do not develop neuritis, while those receiving polished rice and water do. Up to now there is no satisfactory explanation of this.

Summary.—1. Beriberi is a disorder of metabolism and, as it occurs in this country, is associated with a diet in which white rice is the principal constituent.

2. White rice as produced in the mills here commonly makes default in respect of some substance or substances essential for the maintenance of the normal metabolism of nerve tissues. These substances exist in adequate amount in the original grain and in superabundant amount in the polishings from white rice.

3. The estimations in terms of phosphorus pentoxide of the total phosphorus present in a given rice may be used as an indicator of the beriberi-producing power of such rice when forming the staple of a diet in man.

The prevention of beriberi in this country will be achieved by substituting for the ordinary white rice a rice in which the polishing process has been omitted, or carried out to a minimum extent, or by the addition to a white-rice diet of articles rich in those substances in which such white rice now makes default. One such article which is cheap and readily obtained is the polishings from white rice.

The use of parboiled rice, as suggested by Braddon, will achieve a like result, provided that the polishing process is not carried beyond the limited extent now customary.—(C. S. B.)

POL, J. HULSHOFF, DR., Director of the Asylum for the Insane at Lawang, Java. *Beriberi-Forschungen in den Niederländisch Ostindischen Kolonien, besonders in Bezug auf Prophylaxis und Heilung.* (Investigations on beriberi, in the colonies of Netherländish East India with special reference to prophylaxis and cure.) Arch. f. Schiffs und Tropen Hygiene, Band XIV, Beiheft 3. 1910.

Investigations, which, in the course of the last few years, have been made in the Netherlandish colonies in Asia with the view of finding a cure for beriberi, had their origin in some interesting researches on the *Polyneuritis gallinarum* of chickens, made in the medical laboratory of Batavia (Java) some twenty years ago. Eykman, in India, had shown that this polyneuritis yielded to treatment with Katjang-hidjoe bean.

These Katjang-hidjoe (*Phaseolus radiatus*) beans are of the size of young peas, growing very extensively in Java. They are eaten in the form of cakes and also served as vegetables. They are also fed to pigeons and chickens.

There is a Japanese variety of this bean, differing greatly from that grown in Java, in that the beans derived from the latter part of the world are dark-green, while those raised in Japan are either red or black. The favorable results which Gryn's had obtained with these beans in his treatment of *Polyneuritis gallinarum* would perhaps have passed without receiving further notice, had not Roelfsema, on reading Gryn's account, conceived the idea of trying the bean on his beriberi patients. The disease was raging at that time on the island of Sabang among the Chinese laborers. The results which he obtained were so strikingly good, no further deaths occurring among his patients, that great attention was aroused to the value of the bean ever since that time.

The investigations into the treatment of beriberi by our author appear to be so thoroughly scientific, his results so convincing, that we will here give his conclusions. They are:

1. In investigating beriberi a distinction must be made between the disease itself and the paralyses depending upon a degeneration of the neurons.

2. Beriberi can be cured by the administration of the remedies mentioned under 3, 4, and 6; the paralytic affections can get well only through a process of regeneration.

3. Beriberi may be prevented by a daily consumption of 150 grams of boiled katjang-hidjoe beans, sweetened with sugar.

4. Beriberi patients are cured by the ingestion of 150 grams of boiled katjang-hidjoe beans; the remaining paralytic affections get well only by a process of regeneration.

5. The katjang-hidjoe beans have little influence on old cases, since the symptoms in these cases are the consequences of a degeneration of the neurons.

6. Beriberi may be cured also through the administration of a decoction of at least 500 grams of katjang-hidjoe beans daily.

7. The active principle is therefore soluble in water.

8. The chemically purified decoction of katjang-hidjoe beans, containing no nucleins, etc., cures as well as the decoction.

9. On evaporation of the chemically purified decoction certain crystals are obtained, which probably belong to the class of unknown vegetable acids. This acid is provisionally called X acid.

10. The physician must, by personal inspection, insure himself of the fact that his patients actually take the beans, inasmuch as some of them develop an aversion against them after prolonged feeding.

11. The very slight results obtained by Japanese physicians in their treatment of beriberi patients with aduki are in part traceable to the fact that they expected to cure the degenerative results of the disease of the neurons at the same time as the disease itself, consequently their results did not tally with their expectations.

12. The Japanese aduki and the Netherlandish Indian katjang-hidjoe both belong to the same family, namely, *Phaseolus radiatus* L., but are different varieties. The Japanese are red to black; the Netherlandish Indian beans are green. The Japanese variety does not flourish in Netherlandish East Indian.

13. The katjang-hidjoe bean has no direct specific action on the kidneys. The disappearance of œdema is but a general sequence of the cure of the disease.

14. The beans protect against beriberi only so long as they are taken.

15. It is to be recommended to suspend the administration of the bean as soon as a cure is established and the epidemic has passed.

16. An increase in vegetables, whether taken raw or boiled, is attended by neither the cure nor the prevention of the disease.

17. Maize, given in equal quantity and in the same form as the bean, will neither prevent nor cure the disease.

18. The disinfection of the pavilions and the destruction of roaches and other vermin does not prevent beriberi.

19. *Polyneuritis gallinarum*, which presents certain pathological anatomical resemblances to beriberi, is likewise cured by the administration of katjang-hidjoe beans or a decoction made from them.

20. *Polyneuritis gallinarum* is not influenced by the administration of the nucleins obtained from the beans of katjang-hidjoe.—MEDICAL INSPECTOR H. G. BEYER.

CHAMBERLAIN, W. P., BLOOMBERG, H. D., and KILBOURNE, E. D., U. S. Army.
The work of the board for the study of tropical diseases in the Philippines.
 The Military Surgeon, August, 1910.

In this report is contained the results of the army experiments continued over a considerable period to test the value of colored (orange-red) underclothing as a means of preventing the untoward effects of the sun's rays in the Tropics. The board concludes as follows:

From the results of the whole test and the experiments, the conclusion was reached that the physiological effects of the climate in the Philippines can be and probably are produced by moist heat without the aid of the sun's actinic rays, and no evidence was found that the sun's rays alone could or did produce these effects. On the contrary, the test underclothing added materially to the burden of heat which the system was compelled to endure and which is probably the chief cause of tropical deterioration. Even if the actinic rays have any influence on the system, it is believed that they are sufficiently excluded by the khaki uniform and the campaign hat.—(C. S. B.)

HYGIENE AND SANITATION.

Medical Inspector H. G. BEYER and Surg. F. L. PLEADWELL, U. S. Navy.

TREMBUR, H., Dr. Marineoberstabsarzt. "**Explosions-gase und ihre Wirkung auf den Menschen**" (Explosion gases and their effects on man), *Marine Rundschau*, June, 1910, p. 726 (a translated summary).

Among the numerous questions having received renewed attention since the termination of the Russo-Japanese war is the one dealing with the composition of the gases resulting from the explosion of shells and their effects on the human organism. The question itself is by no means a new one, and many of the devices now in use to counteract the pernicious effects of such gases are indeed the results obtained from former investigations with regard to this point.

During mining operations the men in the galleries, exposed to the effects of the gases from exploded powder, sickened and showed a complex of symptoms, which was summed up under the term of "mine disease." The effects noted varied all the way from headache and dizziness to complete unconsciousness. Many of the men, brought out into the fresh air, made the impression as if drunk, showing unsteadiness of gait, laughed inordinately without any apparent cause, wept or whined beat about themselves like maniacs, or appeared dull or apathetic. An officer brought up from below, after having apparently recovered, asked why he wasn't brought up in the fresh air; he was suffering from temporary blindness. A feeling of extreme fatigue, muscular weakness, impossibility to stand or walk, trembling of hands and feet, cramp-like muscular contractions, general nausea, involuntary passing of urine and feces, spasmodic contractions of the diaphragm, and complete unconsciousness are among the symptoms observed and noted. While some of the cases terminated fatally, the great majority of them recovered shortly after having been removed into the fresh air. Headache and a feeling of fatigue rarely continued for more than a few days.

From the very beginning the tendency was to discover the particular form of gas to which the poisonous effects were due, for the composition of powder

gases is a complex one. Sulphuretted hydrogen, at first under strong suspicion of causing the characteristic effects described above, was soon proved not to be the cause. The key to the whole question was the absolute proof of the presence of carbon monoxide in the blood of those who died in the mine and of the experimental animals kept in the galleries during mining operations. Of all the numerous remedies and devices to protect the men from the pernicious effects of these gases that have so far been tried, none can compare with the immediate removal of the stricken into the fresh air, which means a prompt and efficient ventilation.

On board a man-of-war there are three sources from which poisonous gases may be derived and endanger the well-being of the men: (1) The smoke from burning cartridges, (2) the spontaneous combustion of ammunition, and (3) the explosion of the enemy's shells and the resulting gases spreading in the ship and penetrating into the living spaces of it.

Observations on nitro powder show that the smoke produced from it, while less in amount than that from black powder, is still sufficient to interfere with gun sights and the comfort and well-being of the men. Attempts to reduce the quantities of all combustible substances in the cartridge have lessened, but not removed, these inconveniences. As a practical example, our author quotes from a report by the French naval surgeon Gazeau, published in the *Arch. de Med. Navale*, 1907, as follows:

"During practice firing in June, 1906, with the wind aft and with conditions under which the smoke could not be promptly removed, the men in the turret became wrapped up in a cloud of smoke so dense that the individual members of the gun crew could not be distinguished. Although the rapidity of fire was thereby much impaired, the firing was continued to the end. At the end of the practice the entire gun crew was found in a condition that would not have permitted its remaining in such smoke for even a few minutes longer without dangerous consequences. The men complained of headache, neckache, dizziness, so pronounced that some of them fell on leaving the turret, vomiting recurring even during the afternoon of the same day. As a preventative, an arrangement for the supply of compressed air was demanded."

Accidents of this kind can be prevented only by mechanical means, but it also becomes of considerable importance to note whether the combustion of nitropowders is complete or incomplete. During the incomplete combustion certain oxides of nitrogen are formed, which are further oxidized to nitric and nitrous acids providing air is admitted, and which give a dense yellow nontranslucent smoke, strongly irritating the eyes and the breathing organs of the men. The ammonia powders are attended by a more complete combustion, and the various oxides of nitrogen are not present in such smoke.

Trembur quotes from several accidents occurring on board the *Marco Polo*, through the spontaneous ignition of ballistite, which were reported by the Italian naval surgeon, Campo: "While at anchor before Chemulpo, on September 8, 1904, an explosion occurred in one of the ammunition chambers. The doors of the chamber being open, the adjoining compartments filled rapidly with a dense yellow to brownish smoke, which the men on duty were obliged to inhale. The amount of irritation of this smoke on the respiratory passages of the men during the first twenty to twenty-five minutes of exposure to it was unexpectedly slight. Only 6 of the men reported themselves sick at once, complaining of burning sensations in the eyes and pain in the head and chest, symptoms which grew worse during the night. Three of the six men died from œdema of the lungs and paralysis of the heart, while the remainder got well after a somewhat prolonged convalescence. Thirteen other cases reporting themselves sick on the following day suffered from headache and difficulty in

breathing, ending in pronounced bronchial catarrh, with a yellowish-brown expectoration. In some these symptoms were accompanied by diarrhetic stools likewise of an intensely yellowish color. In 12 other cases in whom the symptoms were of the lightest kind the same yellow stools were noted. The gravity of the symptoms stood in direct proportion to the length of time the different individuals had been exposed to the smoke. Those who succumbed had been stationed nearest the place where the fire occurred.

"On May 26, 1906, while at Hankow, another ignition occurred in the same chamber. This time only nine men sickened, complaining of an intense irritation in the eyes, of cough, nausea and vomiting, headache, and great fatigue. Two of the men had cramps of the muscles and of the diaphragm, dangerously interfering with breathing. All recovered after a few days of convalescence."

The relatively favorable results obtained during the latter of the two explosions Campo explains as due to the better ventilation employed during the management of this explosion. The immediate opening of doors and portholes permitted the incoming air to dilute the combustion products that had escaped in the living quarters, and the shutting of the doors of the combustion chamber limited the escape of the smoke to that chamber, whence it was later removed through the exhaust pipe.

Very characteristic was the difference in the color of the smoke in the two cases. The dark yellow smoke of the first explosion gave rise to no very great irritation to mucous surfaces, and consequently it was respirable without difficulty. Campo explains this on the basis of the conversion of the various oxides of nitrogen in the smoke into the nonirritable but highly poisonous nitrous oxide through contact with air. Consequently, also, the prolonged signs and symptoms of intoxication noted in the first explosion, while in the second explosion, this conversion not taking place, the men were exposed to the less toxic but much more irritating fumes of the nitric and nitrous acids. As Trembur remarks, it does not seem very clear why the air should affect the same gases so differently in the two cases, always of course assuming that in both cases the gases were produced by slow combustion and not by quick explosion, and this, according to the description, may be assumed to have been the case.

Ballistite consists of equal parts of nitroglycerin and guncotton. The combustion of 1 kilogram of nitroglycerin furnishes 162 liters of carbon monoxide, 58 liters of carbon dioxide, 218 liters of nitric oxide, 6 liters of nitrogen, 7 liters of hydrogen, and 1 liter of methane. The 35.9 per cent of carbon monoxide, considering its poisonous properties, can hardly be neglected in a study of the poisonous effects upon man of explosive gases. We must therefore agree with the simpler interpretation given by Trembur, when he explains the difference in the two accidents as being due simply to the greater dilution of the smoke in the latter from what it was in the first of the two accidents.

Of still greater importance to naval surgeons are the gases which in future naval battles will be introduced into ships through the explosive shells. The more perfect in construction the explosive shell becomes the more certain the fact that we shall have to reckon with its explosion after piercing the armor in the interior of ships and the more likely it is that we shall in the future have to deal with the effects of poisonous gases on the men during an engagement.

The slightly varying composition of the charges employed by different nations can have but little influence on the products of explosions, especially since picric acid has been displaced in their manufacture by the more resistant and the more difficultly detonizable trinitrotoluol ($C_6H_2CH_3(NO_2)_3$).

For questions interesting medical men the knowledge of an accurate composition of the charges of explosives is not of much importance on account of the products of their decomposition being about the same in all. The decisive con-

stituent is oxygen. The more oxygen is present during the explosion the more completely the carbon and hydrogen present will be oxidized into carbon dioxide and water, while in the case of a deficiency in oxygen the combustion will be less complete and the more hydrogen and carbon monoxide will be present in the final smoke produced. The rapidity of combustion likewise influences the completeness of the oxidation occurring in the charges. Trembur gives the following analyses obtained by Lewin and Poppenberg of the gases resulting from different explosives during their combustion:

	CO.	CO ₂ .
	<i>Per cent.</i>	<i>Per cent.</i>
Nitrocellulose	46.9	16.8
Gelatinedynamite	34.0	32.6
Carbonite	36.0	19.2
Ammonol	23.7	6.1
Picric acid	61.1	13.5
Trinitrotoluol	57.0	1.9
Coal dust	34	6.7
Illuminating gas	4.6-10.0	3-8.0
Water gas	41.0	4.0
Mine gas	3.8	52.0

Explosions with picric acid and trinitrotoluol, under similar conditions, give amounts of carbon monoxide that surpass 30 per cent. Trembur calculates approximately that 1 kilogram of any of the above explosives will develop 300 liters of carbon monoxide; consequently a shell loaded with 10 or 40 kilogram explosive charge must develop 3,000 or 12,000 liters of carbon monoxide. The content of 0.3 per cent of carbon monoxide in the air produces toxic symptoms in man. The above quantities of carbon monoxide would fill a room of 900 or 3,600 cubic meters capacity with a dangerous amount of CO. Three simultaneous explosions of 10-kilogram charges each within a casemate of 2,700 cubic meters would therefore seriously endanger the gun crews if the resulting gases would remain in the casemate. This is, however, not the case, and large quantities of the gases are pressed out. Nor is the entire charge decomposed during an explosion, but small portions of it are reduced to a coarse powder, the minute particles of which are driven deeply into the skin of the gunners.

Carbon monoxide, on account of its greater affinity for hæmoglobin than oxygen, takes the place of the latter in the hæmoglobin molecule, interfering with the free distribution of oxygen in the organism, thus practically depriving the organism of its oxygen for the time being. When 50 to 75 per cent of the red blood corpuscles are charged with CO instead of with oxygen, death is inevitable.

Although an absolutely sure case of poisoning by CO from explosive gases has not yet been recorded, experiments on animals by Lewin and Poppenberg leave no doubt as to the correctness of this assumption. When the animals were placed in a box, in which either picric acid or trinitrotoluol was exploded, the symptoms that followed were in either case those of CO poisoning. Whenever the air of the room contained 0.33 per cent of CO a paralysis of the hind legs occurred after an exposure to the gases of eleven minutes, and recovery without interference was impossible.

Experiments on rabbits, which are known to be less sensitive to CO than is man, have shown that they remained unaffected in an atmosphere containing 0.04 per cent of the gas during a period of sixty-six hours; 0.15 to 0.23 per cent produced dangerous symptoms after an exposure of several days; 0.3 per cent after twenty-four hours; 0.4 per cent after four hours. Amounts above this caused a rapidly fatal result.

A few experiments have also been recorded on man. Gruber respired for three hours 0.021 to 0.024 per cent without noxious effects. According to him 0.2 per cent produced dangerous symptoms in man. In sea fights we will have to reckon with the more severe forms of intoxication. An acute case having passed the critical stage, it must be remembered, may still be followed by hemiplegia, paralysis of bowel and bladder, disturbances in the peripheral nervous system, mental disease, skin eruptions, and sugar and albumin in the urine.

The proof of the presence of CO in the blood of patients by the spectroscopic method can alone be regarded as absolutely positive, and light cases may not give this reaction.

It is indeed strange that not a single undisputed case of death due to this cause has been made known to us during the entire Russo-Japanese war, and even the records of cases of sickness due to explosive gases are very meager and the inferences drawn from them indefinite and uncertain.—(H. G. B.)

TSUZUKI, I. Dr., Generaloberarzt. *Eine von Bazillenträgern hervorgerufene Typhus-epidemie in der XV Division von Japan.* (An epidemic of typhoid originating in bacillus carriers of the XV Division of Japan.) *Arch. f. Schiffs- u. Tropen-Hygiene*, Bd. XIV, heft 5, Mar., 1910, p. 147.

The newly formed Division XV of the Japanese army experienced a typhoid epidemic while stationed in Manchuria between 1904 and 1905. The division remained in Korea after the close of the war until February, 1907, then went to Narashino, and, lastly, moved to Toyohashi in October, 1908. The epidemic continued, although the annual morbidity decreased steadily.

A search for bacillus carriers was instituted. Besides convalescents, the search was extended to numerous healthy soldiers in the barracks in accordance with the following principles:

1. Soldiers having had typhoid fever before.
2. The members of a company in which a new case had occurred.
3. People employed in the kitchen.

In this way company for company was gone over, until 2,785 persons had been examined for typhoid bacilli in their excretions and until 5,109 examinations had been made. The results showed that among 316 men who had had typhoid fever, 6, or 1.89 per cent, were bacillus carriers, and among 2,469 well people, 2, or 0.08 per cent, bacillus carriers were found; among 51 convalescents 3 were found to be bacillus carriers, or 5.8 per cent.

The bacillus carriers were isolated and kept in a separate compartment under medical supervision until three successive examinations had given negative results. In case of a person showing bacilli in the excretions over six months he was excused from further military service and thus eliminated. The search for bacillus carriers was made with characteristic accuracy and thoroughness. When we consider the great difficulty involved in discovering all the bacillus car-

riers that are scattered through a whole division; with a final result showing that the division has at last become free from infection, there can be no doubt of the fact that the work done must have been both thorough and in every way excellent.—(H. G. B.)

TENNEY, ELMER S., B. L., M. D., U. S. Army, Fort Sherry, Mass. **The sputum of typhoid-fever patients as a possible source of infection.** Boston Med. and Surg. Jour., July 28, 1910, p. 124.

The author, after a very painstaking search for typhoid bacilli in the sputum of typhoid-fever patients, concludes that in cases uncomplicated by pneumonia or by a laryngeal inflammation the typhoid bacillus is not frequently found in the mouths of such patients; that in view of the reported findings of the bacillus in cases complicated by pneumonia and by laryngeal inflammations it would seem that more work, especially upon cases showing these symptoms, should be done along the lines followed in his work. As long as the typhoid bacillus is occasionally found in the sputum it certainly can not be ignored as a possible source of infection.—(H. G. B.)

FROMME, W. Dr., Oberarzt. **Ueber die Beurteilung des Colibakterienbefundes im Trinkwasser nebst Bemerkungen über den Nachweis und das Vorkommen der Colibazillen.** (Aus dem staatlichen Hygienischen Institut zu Hamburg. Director Prof. Dr. Dunbar.) *Zeitschrift für Hygiene u. Infektionskrankheiten.* Bd. 65, heft 2, p. 251, April 12, 1910.

A comprehensive piece of research work in which the more recent literature has been extensively consulted.

Ten different culture media were tested, with the result that the 1 per cent dextrose bouillon was shown to be the most satisfactory medium and to deserve the preference as an enrichment medium. Then follow, in the order of merit, phenol bouillon, Loeffler's green, Bulier's solution, æsculin salt bouillon, lactose gall, 5 per cent milk sugar bouillon, Macconkey's bouillon, hay infusion, and æsculin bouillon.

During an examination of the pure water from a bathing establishment, but known to contain bacillus coli, the presence of the bacillus could not be proven in 23.4 per cent of the samples examined, while in the impure water from the basin of the same establishment 33.1 per cent of the samples examined gave negative results, showing that the colon bacillus is slightly more easily detected in pure than in impure water. With regard to the size of the sample of water examined, it was shown that better results were obtained from samples of 10 to 0.1 c. c. than from samples of 100 c. c.

The larger the samples of water under examination were the more frequently did the coli test and the gas test agree. Water from bathing establishments very frequently showed gas producers not belonging to the colon group, and such waters may therefore be pronounced potable. In agreement with Houston, and Winslow and Phelps, Fromme, from an examination of 673 Elb-water samples, was able to show that coli tests and gas tests coincided more frequently during the winter months than during the summer months.

Certain water bacteria, not of the colon group, possess the power of producing gas in dextrose bouillon at 37° C. It is assumed by some that higher temperatures will exercise a selective influence. The method seemed to be indicated in the case of impure waters in which colon bacilli from cold-blooded animals are to be dissociated from those coming from warm-blooded animals, and much work, indeed, has been done in this direction. Fromme found, in the first place, that bacillus coli is not favorably influenced by a temperature of 46° C., and that growth is much more abundant at a temperature from 35° to 37° than at one of 33° to 46° C. He, therefore, concludes that Eijkman's method does not deserve the credit as one deciding the presence of colon bacilli.

All the methods hitherto employed for the detection of colon bacilli, especially the enrichment media, enable us to show their presence only in a certain percentage of cases. The 1 per cent dextrose bouillon has shown itself as being the most preferable enrichment method. No differences seem to exist between the bacilli from carnivores, herbivores, and birds.

The colon bacillus is occasionally found in the intestine and feces of fishes, frogs, and oysters, also in the water flea (*Gammarus pulex*, once in 102 fleas).

The colon bacillus occurs regularly in the intestine of warm-blooded animals, less regularly in that of cold-blooded animals. The lower we descend in the scale of animal life, the rarer also bacillus coli becomes. The colon bacilli are not found outside as often as has been supposed, but they are found most everywhere on objects with which the human hand comes into habitual contact.

Several instances are cited in which it was strikingly shown how very important the coli-positive result of a water examination was in determining the character of the water and in which the mere chemical examination alone would have indicated an unquestionably and exceptionally pure water.

For the control of waterworks, the coli test should therefore never be omitted; in ground water with a low bacterial count, larger samples should be used for examination and in waters in which the bacillus coli is found to be present, the coli-titre should be determined.

SUMMARY.

First.—The methods hitherto proposed for the detection of bacillus coli, especially the enrichment media, give positive findings only in a certain percentage of cases. The enrichment in a 1 per cent dextrose bouillon at 37° C. is especially to be recommended.

Second.—Eijkman's method is not a sufficiently satisfactory method for the detection of bacillus coli in water and can only be regarded as a method of further enrichment. The temperature of 46° C. is injurious to the growth of bacterium coli.

Third.—Bacillus coli is not ubiquitous.

Fourth.—Proof of the presence of the colon bacillus in drinking water remains a most valuable indication as regards the character of such water.

Fifth.—The bacteriological examination of waterworks for colon bacillus is therefore to be recommended.

Sixth.—The presence in ground and spring waters of colon bacilli is a matter of grave concern, and should lead to investigations into the causes of such contaminations. A coli-positive finding is often the first sign of a contamination.

Seventh.—In purified surface waters, from rivers or dams that are filtered by either natural or artificial means, the determination of the coli-titre is important as indicating the degree of the contamination.—(H. G. B.)

LEHMANN, K. B., Prof. Dr. Quantitative Investigations on the Absorption of Benzol from the Air by Animal and Man. (From the Hygienic Institute of the University of Würzburg.) Arch. f. Hygiene Bd. 72, Heft 4, 1910, p. 307.

The absorption of gases of various kinds through the lungs is being studied with great thoroughness in the University of Würzburg by various competent observers under the very able direction of Lehmann and with approved apparatus and methods.

As an example of a gas, insoluble in water, benzol was selected. It has been shown before that benzol in air could be determined by conducting the gas-containing air through a Lunge's apparatus containing "Nitriersäure" (a mixture of equal parts of sulphuric acid and fuming nitric acid). The benzol is recovered and weighed as dinitrobenzol. By this method it was found that 95.1 per cent could be recovered. After still further improving the method and the apparatus it was found that the full 100 per cent of the benzol could be recovered, showing the accuracy of the method employed in the experiments.

In the experiments on man it was found that while breathing an atmosphere containing from 10 to 16 milligrams of benzol per liter from 97.8 to 84.7 per cent of the contained benzol was actually absorbed, an unexpectedly high percentage of absorption.

In the experiments on animals (rabbits) it was shown that the absorption of the gas in the first half hour varied from 54.5 to 37 per cent; in prolonged inhalation experiments the absorption was retarded in amounts varying with the individual animal; the toxic effects of the gas were not included in the observations.—(H. G. B.)

LEHMANN, K. B., Prof. Dr., and HASEGAWA, Dr. **Studies on the absorption of chlorinated hydrocarbons from the air by animals and man.** (Chloroform tetrachlorcarbon and chlorethane.) (From the Hygienic Institute of the University of Würzburg.) *Archiv. f. Hygiene*, Bd. 72, Heft 4, 1910, p. 327.

From observations on man (Gundermann, Herrmann, and Hasegawa) it was noted that the absorption of chloroform was greatest during the first five minutes, decreasing steadily after that period. In concentrations of 21, 24, and 35 milligrams per liter, the absorption varied between 74 and 80 per cent, going down gradually to 61 per cent. In the case of Hasegawa, the absorption never exceeded 68.4 per cent and went down as low as 50.2 per cent.

In experiments on animals it was found with an atmosphere containing 20 milligrams of chloroform per liter that the absorption, during the first hour, was from 27 to 30 per cent, and at the end of the second hour about 20 per cent. In the third hour it had become 10 per cent, and during the fourth hour 5 per cent. Higher concentrations were noted to follow about the same order.

The absorption therefore seems to be very much higher in man, being 80 per cent, than in rabbits, in which it never exceeded 40 per cent. In all the experiments it was found that from 42 to 90 per cent of the inhaled chloroform could be recovered after the inhalation was stopped; 90 per cent was recovered after an inhalation experiment lasting two hours, 72 per cent was recovered after an experiment of three and one-half hours, and only 42 per cent after an inhalation of nine hours. Such a decrease would make it almost certain that, in certain circumstances, chloroform would be converted into NaCl in the body. The results of the experiments with the other two gases were of a similar character.—(H. G. B.)

LEHMANN, K. B., and BURCK, ARTHUR, Dr. **On the absorption of hydrochloric acid vapors by animals during prolonged experiments.** From the Hygienic Institute of the University of Würzburg.) *Arch. f. Hygiene*, Bd. 72, Heft. 4, 1910, p. 343.

The absorption of this gas seems to proceed at a uniform rate. The amount of the relative absorption, however, seems to increase with the depth of the respirations during the experiment. There seems to be no perceptible decrease in the amount of the vaporized acid absorbed when the experiment is prolonged.—(H. G. B.)

REVIEW. **Hygiene in the French Navy.** *The Lancet*, March 12, 1910, page 750.

The Archives de Médecine Navale in its January number publishes the report by Doctor Mercié, principal medical officer of the French northern squadron, on his inspections of the ships of that squadron in 1909. (A trans-

lation of this article, except the matter here presented, may be found in the previous number of the BULLETIN, pp. 429-438.—F. L. P.) He is chiefly concerned about the ventilation of the rooms for wireless telegraphy, small spaces of about 250 cubic feet (say, 7 by 7 by 5), in which the operator on watch passes continuously two hours at each turn by day and four hours at night, listening to the ticking of the faint Morse signals. To secure quiet this small office is carefully isolated from the rest of the ship by layers of felt, steel, and asbestos, and as openings must be few it is hard to ventilate it. An electric fan is provided, but Mercié notes that, though every operator says that the fan is only very rarely stopped, he has himself never once in any ship found that fan running. There are three difficulties: The fan making a buzzing, which hinders the recognition of signals; it creates in so small a place a fierce draft; and it sucks in unpleasant smells from the outside—from the kitchen, for example. For all these difficulties remedies are suggested. Unfortunately we are not told the pattern of the silent fan found in one of the ships. The confinement in these ill-ventilated offices has not yet, so far as known, developed any disease among wireless operators, but a monthly disinfection of these rooms with formalin is recommended. * * *

Such a sanitary inspection of ships must be of very great value, and we are constrained to wonder why no similar system is in existence in the English fleet. This is a matter to which the inspector-general might well turn his attention, and we feel certain that the Admiralty would find that a proposal for the regular medical inspection of the ships would receive a great medical indorsement. * * * He thinks that in battle wounded will only be moved in something like the Kirker sleigh, and that all lifts will early be put out of gear, and, being useless, in his opinion, for battle, should be no longer fitted in ships. He observes that he tried to get petty officers instructed in "first aid" on board their own ships. He himself found them most intelligent and eager to learn, but by the end of the year little instruction had been given, largely, as he says, by reason of "inertia, as much of captains * * * as of senior medical officers." In our navy (i. e., the British Navy) this instruction is ordered and, we understand, carried out. In the last health report of the German Navy it is said that care was specially taken to teach the principles of first aid, "at any rate, to most of the crew," while the men of the ambulance party were in several ships taken off their other duties for fourteen days or more and sent to the sick bay to learn how to carry the wounded and attend to the sick.—(F. L. P.)

SURGERY.

Surgs. RAYMOND SPEAR and EDGAR THOMPSON, U. S. Navy.

CARREL, ALEXIS. On the experimental surgery of the thoracic aorta and the heart. *Annals of Surgery*, July, 1910.

The author discusses the results of his experiments on animals and believes with improved technique aneurisms of the thoracic aorta can be extirpated and the circulation can be reestablished by a vascular transplantation. It may be possible also to improve some of the valvular and vascular diseases of the heart by surgical procedures.

In the matter of general technique most of the bad results following intrathoracic are due to the lack of adaption of the technique to the

physiological conditions of the chest. Infection of the pleural or the pericardial cavities and respiratory disorders due to penetration of air into the thorax are directly responsible for failures.

Pleural infection is the most dangerous. Many animals operated upon by Sauerbruch and Haecher in Germany and by Bernheim, Robinson, Janeway, and Green in this country have died of a sero-fibrinous pleurisy.

The technique that will insure healing by primary union in abdominal cases is inadequate many times when applied to the surgery of the thorax, often surgical asepsis is merely a condition of nonsuppurative infection. It is very probable that the more marked states of non-suppurative infection can be very dangerous in intrathoracic surgery, so better asepsis is to be employed if good results are to be obtained.

A higher degree of asepsis can be obtained by strict attention to every detail of the preparation of the patient, operators, ligatures, etc., and what is also very important, tissues should be handled as little as possible and not bruised. The pleuræ should not be damaged by retractors or forceps and should not be irritated by gauze.

As soon as the thoracic cavity is opened the lungs should be covered with fine Japanese silk compresses impregnated with vaseline. The silk tissue protects the pleura and prevents irritation and also is efficient in walling off the operating field; it also prevents the evaporation from and desiccation of the surface. To prevent cooling of the viscera, the author uses a piece of thick flannel which he places on the silk compresses and keeps the temperature of the operating room at 29° or 30° C. It is important not to allow blood to flow through the pleural cavity, and it is also important not to sponge the pleural cul-de-sac if infection is to be guarded against.

Carrel used simple sutures and ligatures in his lung cases, and did not employ any of the elaborate methods used by some operators for closing bronchial stumps, and his animals made good operative recoveries. In the series of cases in which the thorax had been widely opened and simultaneous operations on the heart and the large blood vessels had been performed seven cases of serofibrinous or purulent pleuritis developed out of the 28 operated upon.

The asphyxia which is produced by a pneumothorax can easily be prevented by the use of a Sauerbruch or Brauer chamber. On man a one-sided pneumothorax is not very dangerous, but it is safer to use a positive or a negative pressure apparatus.

The Meltzer and Auer method of intratracheal insufflation will often prove efficient when voluntary breathing has ceased while intrathoracic operations are being performed by the Sauerbruch method.

Valuable deductions have been made from experiments on animals on which have been performed operations on the thoracic aorta and

on the heart. So when the technique has developed satisfactorily it will be possible, in the author's opinion, to successfully operate on some aortic aneurisms, relieve valvular stenoses, and perform operations on the heart muscle and on its individual blood vessels without upsetting the nervous mechanism.

The great immediate danger in operations on the ascending and descending aorta is death from the central nervous system, due to stoppage of the blood current. The ascending aorta can only be safely clamped for one minute; the descending has been clamped for ten or even fifteen minutes without permanent damage; a longer time than this produces a lesion of the anterior horns which result in a spastic paralysis of the posterior limbs of the animal.

The blood current can be diverted in two ways—(1) by a temporary intubation of the aorta; (2) by an artificial collateral circulation. The first method is performed by laying the vessel open by longitudinal incision and inserting and fixing a paraffined tube. The wall of the aorta can then be extirpated while the circulation goes on through the tube. When the operation is completed the tube can be removed through a small longitudinal incision. The other method, by lateral diversion, consists in establishing a communication between the left ventricle and the descending aorta or between two parts of the aorta. This anastomosis was made by means of a paraffined rubber tube or of a large jugular vein which has been preserved in cold storage. One end of the tube or vessel is inserted into the apex of the left ventricle and fastened; the other end is secured into the descending aorta. The ascending aorta is then clamped. The blood goes then directly from the left ventricle to the descending aorta.

The author has the first successful case of suturing of the ascending aorta, several end-to-end anastomoses of the descending aorta, and grafting on the descending aorta of a segment of vein preserved in cold storage.

Carrel is to be congratulated on the success of his experiments, as they are opening up a surgical pathway for the cure of conditions that heretofore were beyond surgical aid.—(R. S.)

ELSEBURG, CHARLES A. Clinical experiences with intratracheal insufflation (Meltzer), with remarks upon value of the method for thoracic surgery. *Annals of Surgery*. July, 1910.

Attention is called to the "respiration by the continuous insufflation of air" as described by Meltzer and Auer, in which method a small rubber tube was passed into the trachea almost to its bifurcation, and by means of a foot bellows air mixed with ether was blown into the lungs under a pressure of 15 to 20 m. m. of mercury; the excess of air passed upward in the trachea and through the larynx

in an almost continuous stream. By use of this method a large number of experiments were performed on animals with entire satisfaction. It was possible to expose and perform operations on all the thoracic organs without danger of lung collapse.

The method of intratracheal insufflation is so much simpler than the negative and positive pressure methods of Sauerbruch and Brauer, which require elaborate cabinets, and as it requires very little and inexpensive apparatus it can be used by all surgeons and promises to be of the greatest value in the development of thoracic surgery.

The author advises the use of a fairly rigid rubber tube with an opening at the lower end. The tube should be as long as a stomach tube, and different sizes should be on hand; ordinarily speaking, the tube should fill about one-half the lumen of the trachea; the size of the trachea can be roughly estimated at the root of the neck; average size is about No. 28 French.

The patient is first anæsthetized; the pharynx and larynx are then painted with a 10 per cent solution of cocaine. Sometimes the tube can be introduced by simply pulling the epiglottis forward with the index finger of the left hand and then introducing the tube into the trachea with the right hand or by means of a laryngeal forceps.

The tube is introduced slowly until a slight resistance is felt; this is usually the bifurcation of the trachea. The tube is then withdrawn for a distance of 1 inch and can be held in place against the upper teeth by means of a special mouth bit devised by Elsberg. The mouth can be sponged out and a stomach tube can be introduced if desired. The sound of the air as it passes up and down the tube in expiration and inspiration shows at once that the tube is in proper position. The tube may slip down into the right bronchus and stop at its division. This fact can easily be determined by the absence of breath sounds in the left lung.

When the tube has been properly placed, it is connected with the air-pressure apparatus and the air blown through at a pressure of 10 m. m. of mercury; after several minutes the pressure is raised to 20 m. m. and the operation can be commenced.

The author has used intratracheal insufflation on three cases—one case of myasthenia gravis, one case of abscess of the lung, and one case of empyema.

In the first case a mixture of oxygen and air was introduced into the lungs when the patient was "unconscious, deeply cyanosed, and pulseless." In one minute the "face became pink, all cyanosis disappeared, and the pulse could be felt at the wrist." This patient was kept alive for five hours after her respiratory movements had ceased.

The second case was one of abscess of the lung. The first attempt at intratracheal insufflation was unsuccessful, but the operator, Lilienthal, resected 4 inches of the eighth and ninth ribs and packed the

cavity with gauze. The second attempt at intratracheal insufflation, six days after the first attempt, was entirely successful. The patient was first anæsthetized with ether, the larynx and pharynx were thoroughly cocainized, and a No. 28 French rubber tube was passed into the trachea without difficulty and a mixture of air and ether was blown in at a pressure of 15 m. m. of mercury.

During the operation, which lasted thirty minutes, there was no cough, all evidences of mucus disappeared from the trachea and pharynx, the color was good, the respirations were regular, and the pulse was good. The lung was exposed, palpated, and explored for the abscess. The air current was stopped and the lung collapsed and assumed a dark-green mottled color; it was then distended by using 25 m. m. of mercury pressure and became bluish in color, with red areas. When the lung collapsed, the œsophagus and aorta were seen and examined. When the pleural cavity was finally closed, 30 m. m. pressure was used to expand the lung, so as to exclude all the air. This patient regained consciousness very quickly; he was not hoarse, and there was no pain in his larynx.

In the case of empyema, in which a rib was resected and the pleural cavity drained, the intratracheal insufflation of ether and air was performed after the patient had been etherized. The anæsthetic was easily given and was very satisfactory; "very little ether was required; the patient's color and pulse remained good." There were no after effects from the insufflation.

Intratracheal insufflation can be used in the treatment of asphyxia from chloroform, opium, etc. The apparent ease with which it may be used in human beings should induce all surgeons to become familiar with its use.—(R. S.)

FULLER, EUGENE. The surgical management of urethral stricture and its complications. Medical Record, April 2, 1910.

The writer gives the following as the pathology of strictures: 1, Granulations; 2, round cell infiltration; 3, chronic urinary extravasation; 4, true cicatrix. Any stricture may be caused by various combinations of these pathological elements. Round cell infiltration and chronic urinary extravasation are more frequent and important causes than scar formation, and the realization of this fact has changed surgical treatment.

Fuller, therefore, says that surgical treatment should be based on the diversion of the urine from the strictured area and giving it rest. This may be accomplished by external urethrotomy and drainage.

Cases of the author, and Moullin, of London, are cited, tending to demonstrate that this treatment by diversion has alone caused the complete cure of stricture.

When the stricture is exposed the walls of the urethra should be made smooth, and pouches, diverticulæ, and false passages removed. In traumatic stricture, with scar formation, a new channel must sometimes be made by partial resection from the anterior or posterior face of the stricture.

In the final operative steps, and after treatment, the author has abandoned the introduction of sounds to prevent contractions and treats with a "urethral splint," as follows: A perineal vesical drainage tube is passed through the incision into the bladder; next a rubber tube of the fine caliber of the urethra is passed through the meatus and the end trimmed to snugly fit the shape and curve of the perineal tube as it passes out.

The perineal incision is closed over the "splint" and the urine drains through the perineal tube. The splint is usually left in position for ten days.

In all serious complications, such as abscess, fistula, large, chronic extravasations, gangrene, deep strictures, etc., the author advises primary diversion of the urine through the suprapubic fistula, with the usual subsequent perineal operation when the stricture is free from complications.—(E. T.)

HANDLEY, W. SAMPSON. Hunterian lecture on the surgery of the lymphatic system. British Med. Jour., April 9, 1910.

The author states that the evolution of lymphatic surgery has been in two phases. In the rudimentary stage the surgery was radical in principle, thus, amputation or excision have been the methods of choice for lymphatic œdema, while serous effusions were drained externally.

The conservative stage of lymphatic surgery, which the author claims the honor of introducing, consists in the establishment of capillary drainage by the substitution of long silk threads for the destroyed lymphatic vessels, glands, and spaces.

The most marked results of this conservative treatment occur in cases of œdema of the arm in cancer of the breast.

When the extending circle of cancerous growth causes destruction of the lymph tracts from the arm, or when these tracts are destroyed by operation the arm will become œdematous, and for this condition Handley proposes the following operation of lymphangioplasty.

Long silk thread drains are run in the subcutaneous tissue from the wrist up the arm, over the shoulder, and into the back, where they end. The silk should be No. 12, woven and long enough to be continuous from the wrist to the back of the body. A small incision is made in the wrist and the silk is introduced threaded on a long probe. The probe is pushed up toward the elbow as far as convenient in the sub-

cutaneous tissue. A second small incision is made and the probe drawn out and reintroduced upward. This is repeated until the drain is led over the shoulder and into the subcutaneous lymph spaces of the back.

Other drains are introduced in the same way. Toward the shoulder the lines of silk in the flexor surface of the arm curve outward around the deltoid and then on into the back.

In order to bury the ends of the drains in the back they may be cut shorter than the probe so that when the probe is thrust downward under the skin of the back the silk will become unthreaded and left in the track made by the removed probe. After the drains are thus tucked away all incisions are closed.

The benefits expected from this operation are: (1) Complete relief from pain within a few hours if the nerves are still normal; (2) marked and rapid fall in tissue tension of the entire area drained by the threads; the arm, in consequence, instead of being hard and brawny, becomes abnormally soft and flabby; (3) rapid subsidence of swelling commences immediately at the hand; (4) return of function to the paralyzed arm if the case is of recent date.

From the nature of the cases this operation merely gives relief to a distressing and painful complication of cancer. All cases must be selected. If there is pleuritic effusion the results will not justify the operation. If there is any cancer growth in the arm the drains must not be used. In one case the threads were placed through an area of cancer cells and these spread at once along the track made by the drains.—(E. T.)

WOOD, ALFRED. A tourniquet for the control of hemorrhage from the scalp during osteoplastic resection of the skull. *Annals of Surgery*, May, 1910.

Wood states that perfect control of hemorrhage from the scalp after large incisions and prolonged operation is difficult. This is due to the fact that the abundant supply of vessels is firmly held in dense connective tissue and they can not contract nor retract when cut, as they do in other situations. Further, on account of the oval shape of the head, with receding portions on each side, elastic bands are only partially effective when excessive pressure is made on the forehead and occiput, while in the temporal regions the pressure is not sufficient to control the hemorrhage.

The author has devised a tourniquet consisting of a metal frame, hinged and adjustable at four points, in which is laid an inflatable rubber tube. The frame can be adjusted to conform with the general shape of the head and serves as an external resistance to the tube.

When the tube is inflated, uniform pressure is applied to all parts of the scalp.

By means of a bulb and cock, inflation and deflation can be made without disturbance to the progress of the operation.

The author reports that he has used his tourniquet for several years and has made completely bloodless operations.—(E. T.)

STRETON, J. LIONEL. A further contribution on the sterilization of the skin of operation areas. *British Med. Jour.*, June 4, 1910.

The report is based on 291 operative cases in the author's practice. In a previous communication 57 cases were reported in the *British Medical Journal*, 1909, II, page 368.

The method of the skin disinfection was performed as follows:

The operative area was not shaved and was first painted with a methylated spirit solution before the patient was anesthetized. The second painting was made with the tincture of iodine when the anesthesia was complete. The final painting of the skin was made at the completion of the operation with tincture of iodine. The solution of iodine in methylated spirits was used for the first painting because it was cheaper than the tincture. The iodine solution made with the rectified spirits is less irritating and is to be preferred.

The cases operated upon included operations performed on all parts of the body, some of the cases being infected. The infected cases all did well; some healed *per primam*. Of the clean cases, but three failures were recorded, but in all probability the result would have been the same if any other method of skin disinfection had been used.

The author is enthusiastic in the use of this method of skin disinfection, claims it to be efficient, and points out the great saving in cost as compared with methods in which patients are prepared one or two days beforehand and gauze dressing used.

Iodine stains can be removed by using a 1 per cent solution of cyllin or a 3 per cent solution of carbolic acid.—(R. S.)

CRILE, GEORGE W. Note on the neuropathologic cytology of anemia, infections, Graves's disease, and surgical shock. *Annals of Surgery*, June, 1910, p. 753. (See also *Nav. Med. Bull.*, October, 1909, p. 355, references under "15").

Crile has continued the work begun with Dolley on the cerebral cytology of various states and presents the results of his further study. His findings, in harmony with those of others, show that the principal gross change in the neurocyte, involving the nucleus plasma relation, holds as a general law for nerve cells impaired by fatigue, starvation, anemia, infection, drug poisons, or shock. There-

fore, the changes in the brain cells (for a description of which see BULLETIN, October, 1909) are not specific for any etiologic factor so far as known.

Anesthetics.—In a series of parallel experiments on animals with ether and nitrous oxide, it was found that the damage to the brain cells under ether was four times as great as that under nitrous oxide.

Anemia.—The changes seen in anemia vary from hyperchromatism to every stage of cellular change down to the death of the cell. There seems to be first overwork, then later exhaustion, the metabolic process requiring some time for elaboration. If the hyperchromatic or hyperactive stage has ended and the chromolytic or exhaust stage is entered upon before an efficient circulation is reestablished, there is little or no hope of saving the patient. In desperate cases of hemorrhage it becomes necessary to think in terms of neuro-cytologic changes, not in pulse palpation and thirst.

Infections.—Of the large amount of material studied there were no exceptions to the type of changes seen in the cells. Experiments on intestinal gangrene brought out interesting observations. It was there found that after the lapse of a definite time of total exclusion of the blood supply the intestine became gangrenous. If the obstruction were released, the animals died sooner than if it were not released. If the gangrenous coil were excluded by an entero-enterostomy and all obstruction thus relieved, death occurred in twenty-four to forty-eight hours. This was true even if the gangrenous coil were resected. These phenomena were at once explained by observing precisely similar results following the injection of even a small quantity of the expressed juice of the gangrenous intestinal coil subcutaneously, intravenously, or intraperitoneally into normal animals. The widespread impairment or destruction of the brain cells indicated that a sufficient amount of the toxins to cause death had already been absorbed and fixed in the brain cells or that death was insured by the added amount squeezed into the circulation by the operative manipulations. It follows that the absolute blocking of the circulation between the poisonous gangrene and the adjacent healthy tissue should be effected even before dividing the strangulating ring.

Graves's disease.—The one case studied, having died without any known complications, showed the usual changes in the brain cells. The cells of rabbits, also, which had been frightened, exhibited similar changes.

Since the ultimate surgical risk is determined by many factors (shock, hemorrhage, anesthetics, anemia, infection, psychic stimuli), some more easily controlled than others, a better understanding of the physical basis of such factors will * * * serve the surgeon as a helpful guide.—PASSED ASST. SURG. H. W. SMITH.

STANLEY, A. L., A. M., M. D. *The treatment of post-operative adhesions.* Washington Medical Annals, March, 1910.

Where no adhesions have existed before an operation their prevention depends upon the adoption of a careful technique which consists in a gentle handling of the intestines and other contents of the abdominal cavity, the avoidance of exposure, the painstaking obliteration of raw surfaces due to surgical manipulation, the thorough stoppage of all hemorrhage, and the avoidance of drains whenever possible.

The replacement of the abdominal viscera in their normal relations is important. Many specific methods have been suggested and practiced to prevent adhesions. Sterilized air has been injected under pressure to keep the intestines separated. Oxygen gas has been introduced in the abdominal cavity to secure its solvent effect on adhesions. Sterile olive oil, as well as gum-arabic solutions, have been used as a sort of lubricant.

Hetzler has approached this condition by attempting to prevent the formation of fibrin by drugs which diminish the coagulation of the blood. He used phosphorus by the mouth to destroy the fibrinogen, and peptones hypodermically to neutralize the fibrin ferment.

Cargile membrane (sterilized ox peritoneum) was extensively used at one time to cover raw surfaces.

Active peristalsis has been suggested with the hope that motion would prevent adhesions.

Gellhorn (*Surg. Gyn. and Obst.*, May, 1909), influenced by Bier's teachings, has strongly indorsed the use of dry heat in gynecology. Bier used a simple box and a small sheet-iron chimney. Gellhorn substituted a semicircular cradle made of thin sheet iron lined with asbestos and containing 8 electric-light bulbs. He uses 16 to 32 candlepower lights, according to the amount of heat desired. By using a perfectly dry heat the temperature of the chamber can be raised as high as 300, though 200 to 220 is hot enough for most purposes. The air is kept dry by using bags of calcium chloride suspended under the hood. The effect of this extreme heat is to induce an active hyperemia, which extends to and affects the abdominal organs. The first effect is a relief of pain and a soothing relaxation and sleepiness. Without going into any particular detail of its therapeutic uses it is sufficient to mention its advantages in the absorption of para- and perimetritic [perimetritic?] exudates. During fever the hot-air treatment of a pelvic exudate is contra-indicated on account of the tendency to promote the formation of pus. In the chronic stage of a pelvic exudate, where the tissues are hard and the organs are displaced and fixed, the results of the treatment are unusually satisfactory. There is noticed a relief of pain and complete cessation of discomfort after four or five treatments. The number of treatments varies from 8 to 35. In regard to post-operative adhesions, he says: "The hot-air treatment is also useful in recent post-operative adhesions; when following an otherwise clean laparotomy slight elevation of temperature occurs after the regular evacuation of the bowels, and in the absence of disturbed wound healing or any other tangible cause we must assume that adhesions are forming. In such cases I do not hesitate to apply the hot-air treatment after the sixth day 'post operationem,' and have observed repeatedly

that the temperature subsided and that on later examinations no evidence of adhesions could be found."

Bands are a source of distress and danger, by limiting mobility or producing obstruction, and must be removed. When the intestines are adherent by broad surfaces to other loops or to the abdominal parietes, unless disagreeable symptoms are produced by their presence, they are better left untouched, as a harmless condition may be converted into one attended with disastrous consequences. When it is necessary to separate extensive adhesions it is a serious problem to know how to do it to the best advantage. Fortunately, the peritoneum is loosely attached, and it is often possible to strip it loose and transfer it so as to cover over the offending raw surfaces.

In the same way omental grafts can be transplanted, and they do well except when applied to the small intestines.—(E. T.)

MCDONALD, ELLICE. An improved method of preparing catgut ligatures. *Am. Jour. of Surg.*, May, 1910.

The ideal catgut should be strong, sterile, soft, and capable of preservation for long periods without loss in strength and sterility.

McDonald states that all these conditions are best fulfilled by the Claudius iodine-alcohol method, but it has certain disadvantages.

(1) The Claudius gut does not keep well, but becomes fragile and frangible; (2) the alcohol is not a fat solvent, and sterilization can not be complete unless a good fat solvent is used to wash the fat from the crevices of the gut; (3) the gut is a little hard for manipulation; (4) the alcohol, containing water, swells the gut a trifle in size. Catgut will readily abstract water from alcohol.

For these reasons the author has adopted the following method:

I. Iodine 4 per cent in acetone, eight days.

II. Wash in acetone, four days.

III. Preserving solution, acetone 85 per cent, Columbian spirits 10 per cent, glycerin 5 per cent. The glycerin should first be dissolved in the alcohol and then added to the acetone, as acetone itself is not a solvent of glycerin.

This method has the following advantages:

The solutions are fat solvents and antiseptics; the iodine is used in greater strength than in Claudius's method and it impregnates the gut so that the ligatures are black and well saturated with iodine when they are placed in the clear acetone solution. The pure acetone abstracts the excess of iodine from the gut, leaving the gut clear and white. The preserving solution of acetone, alcohol, and glycerin completes the bleaching and at the same time softens the gut, which is not much softened by the pure acetone. The latter, however, does not harden the gut, but abstracts the water from it and leaves it of the same flexibility as gut that has been preserved in chloroform, as in the well-known commercial process. The addition of the glycerin and alcohol to the acetone in the preserving solution is sufficient in amount to soften the catgut; at the same time the dehydrating power of the acetone prevents the gut from swelling up, as it does when it is placed in alcohol solution.

Acetone is antiseptic and comparatively cheap; it abstracts water and absorbs fat from the gut. Water and fat have no place in perfect catgut—fat means imperfect sterilization, for bacteria may exist in a mass of fat untouched by the

antiseptics; water swells the gut and softens it, and when the gut dries on the instrument table it becomes hard, as does all rawhide or leather after having been immersed in a watery solution.

To insure sterilization the gut may be boiled in paraffin oil over a sand bath at 212° F. and then run up to 300° F. before being placed in the preserving solution.

This method is one that any surgeon can use, and good sterile gut can be made from ordinary violin strings.—(E. T.)

ACKERLY, R. Observations on the condition of the mouth in 1,000 consecutive cases of chronic disease. *Proc. Roy. Soc. Med.*, June, 1910.

Ackerly tells his patients that it is far less important what they eat than how they eat it, attention to the manner of mastication is necessary to improve the impaired nutrition. Medical advisers of people suffering with chronic diseases should, from the first, insist on attention to the condition of the teeth, especially if septic, the removal of defective teeth, and the correction of any mechanical impediment to mastication.

His cases are 90 per cent well-to-do people; and not 2 per cent would admit that want of means prevented their having the teeth put right. Of this series, one-third of the patients had teeth sufficient for mastication; the others were defective, one-quarter were obviously septic, and one case in ten had septic gums with rotten stumps covered by plates.

He states that the severity of the throat symptoms of diphtheria and scarlet fever and the severity of an attack of enteric fever depend largely on the presence or absence of oral sepsis; and in appendicitis there is much reason to believe that oral sepsis has much to do with the more severe cases in which a catarrhal rapidly becomes a purulent inflammation.

In the discussion on this paper it appeared to be the unanimous opinion of the speakers that the sepsis was the all-important thing and that the removal of sepsis was immensely more important than the loss of masticatory power. Patients with septic mouths whose teeth were removed improved rapidly and gained in weight after the fountains of pus were removed, even though fewer teeth were left for mastication.—ASST. SURG. L. W. JOHNSON.

GENERAL MEDICINE.

Surgs. A. W. DUNBAR and T. W. RICHARDS, U. S. Navy.

JACKSON, HENRY D. The clinical aspects of arterio-sclerosis. *Boston Med. and Surg. Jour.*, August 11, 1910.

Jackson quotes Councilman's description of the clinical-pathological types of this disease, i. e., (1) the nodular form, seen especially in

the aorta, unimportant clinically unless causative of aneurism; (2) the senile type with calcareous vessels, cardiac atrophy and senile liver and kidneys; (3) a diffuse arterio-sclerosis which is serious, giving rise to practically all cases of "cardio-renal" disease.

The second form, senile arterio-sclerosis, occurs in the very aged and, while the heart is extremely irregular and intermittent, there are no symptoms of heart failure, as shown by œdema, hepatic, renal, or pulmonary congestion, and in the experience of the writer these cases are not especially liable to apoplexy or other diseases attributable to arterial degeneration.

In this form the etiological factors are not likely to be the same as in the third form, where an undetermined toxæmia is probable. Diffuse arterio-sclerosis is important, due to its varied pathological sequelæ and doubtful etiology. It is found often in the robust between 40 and 50 years. The heart is enlarged and may be extremely dilated, causing incompetency without valvular disease. Albuminuria is usually present.

The contributory etiological factors are those which cause high arterial tension. Arterio-sclerosis has been produced experimentally in animals, but the investigators are still in doubt whether it is produced by the high tension *per se* or by toxic action of the drug or other material used.

Intravenous injections of bacteria and also their toxins have been used. Adrenalin produces distinctive sclerotic changes, but here, as following the use of digitalin and nicotine, there is a doubt existing whether the high tension produced is alone causative. These experiments confirm the opinion that the media is primarily affected, the intimal changes being conservatory and secondary.

Bond is quoted in regard to the subsequent history of 100 cases of chronic indigestion in which alcoholism and syphilis were excluded, and in which constipation, deficient gastric motor power, and excessive ingestion of food were present. Of these 30 developed arterio-sclerosis, 5 died of angina, 6 of apoplexy, and 4 of cerebral hemorrhage, while the remainder had increased arterial pressure and abnormal cardiac action.

Alcohol and lead, although not causing high blood pressure, are undoubtedly causative. Syphilis produces a specific form of arterial degeneration. Typhoid fever is reported by Thayer to have caused arterial changes in 30 out of 52 cases. The chief cause of arterio-sclerosis is over eating and the consequent gastro-intestinal disorders, but toxic processes associated with the acute infectious diseases should be assigned greater etiological importance than is now given them.

Clinically the symptoms of this disease may be those due to local circulatory interference and those due to general obstruction, with secondary cardiac enlargement. The former may be evidenced by

irregularity in the aortic second sound, often with a systolic or diastolic murmur showing involvement of the valve.

The significance of this lesion is not based on the murmur, but on the ability of the heart muscle, as shown by its size, to carry on the circulation.

A local lesion requiring a guarded prognosis is that of the coronary artery, which is the most important, and possibly the only cause, of angina pectoris. It is shown by intermittent or irregular heart action, substernal distress and dyspnea upon exertion, with usually an absence of enlargement and other secondary signs of cardiac failure.

Another form is where the nutrition of the heart muscle is impaired by local lesions in the coronary arteries and dilatation ensues.

Local changes in the cerebral arteries cause vertigo, epileptiform seizures, monoplegia, and transient paralysis.

In the peripheral circulation lesions may cause "rheumatic" pains in the muscles or obscure abdominal pains.

In diffuse arterio-sclerosis the symptoms are attributed to hetero or auto-intoxication. The patients, while well nourished, may have a pallor explainable by vascular spasm. Secondarily, there may be cardiac hypertrophy succeeded by insufficiency, shown by light dyspnea upon exertion, a sense of constriction and asthmatic attacks, high blood pressure (160 m. m. or more), and rapid pulse, which is occasionally intermittent. Later cardiac insufficiency develops. The renal changes may be most prominent.

In regard to treatment, dietetic measures as avoidance of excesses, especially in the nitrogenous foods, is of primary importance. Physical and mental stress should be avoided. Potassium iodide gm. .33 t. i. d. and small doses of nitroglycerin are the only drugs of value in this condition.

Considerable evidence shows that the high frequency current is of some value.—(A. W. D.)

THOMPSON, W. GILMAN, M. D. *Trichinosis—A clinical study of fifty-two sporadic cases.* Amer. Jour. of Med. Sci., August, 1910.

This number of sporadic cases occurring in the practice of the writer shows that the disease is not as uncommon as is usually supposed, especially in the vicinity of New York. It is frequently unrecognized. The elapsed time after ingestion of infected meat is about two weeks; the onset is usually acute with headache, sudden chills, vomiting, intense abdominal and muscular cramps. Diarrhea when present is attributable to ptomaine poisoning rather than to the trichinae. Erythema is often a prominent symptom, and in severe cases the prostration and muscular weakness is extreme.

Loss of weight out of proportion to the duration and degree of the fever is a differential point from typhoid fever.

The ocular symptoms may include optic neuritis, ecchymoses, tenderness, or diplopia. Edema of the eyelids, ankles, and major joints is common.

Subjective dyspnea, probably due to invasion of the diaphragm, is common. The blood findings are important. Leucocytosis is not marked, being below that of many purulent infections, pneumonia, and gas poisoning. The diagnostic point is the degree of eosinophilia; in this series of cases it was above 20 per cent in over one-half, above 40 per cent in one-fourth, two cases gave 60 per cent, and one 74 per cent, and two 81 per cent. The degree of eosinophilia apparently bears an inverse ratio to the leucocytosis, but is not an index to the severity of the infection.

Other diseases in which there is eosinophilia are pneumonia just prior to the crisis, 5 to 6 per cent; extensive skin disease, as dermatitis exfoliativa, pemphigus, psoriasis, prurigo, eczema, dermatitis herpetiformis, and leprosy, in all of which it is rarely above 12 per cent and not constantly present. Other intestinal parasites, roundworms, tapeworms, and uncinariasis may cause a low eosinophilia. A case of bronchial asthma gave 12 per cent during a paroxysm.

Thompson has never observed an eosinophilia following the administration of potassium iodide, camphor, or sodium salicylate, as reported by Wile.

Trichinæ were demonstrated *ante mortem* in 29 cases, and in 5 acute myositis was present. The diagnosis in the remaining cases was made on characteristic symptoms, which are summarized as follows: Acute onset of vomiting and abdominal cramps; eosinophilia of a high degree; high fever, usually lasting two to six weeks; puffiness of the eyelids and face; ocular pains; dyspnoea, unaccompanied by cyanosis; general muscular soreness and cramps; and prostration and circumscribed subconjunctival hemorrhages.

The majority of the patients were foreigners by birth and habits, but six were Americans of good social standing. The mortality was low, only two fatal cases occurring in this series.—(A. W. D.)

POYNTON and PAINE. Some further investigations and observations upon the pathology of rheumatic fever. *Lancet*. June 4. 1910, page 1524.

For some years it has been generally held by internists that acute articular rheumatism must, from analogy, be looked upon as an acute infectious disease. but the results of etiological studies have been inconsistent, often, indeed, entirely negative, and the subject

has been further befogged by the supposed specificity of the salicylates. Poynton and Paine, however, during the past ten years, have persistently set forth their reasons for believing a diplococcus to be the bacterial cause of the disease.

The present paper is somewhat controversial in character, being, in part, an answer to recent criticisms directed against the two main conclusions previously stated by the authors:

First, that a diplococcus, streptococcus, or micrococcus is a cause, and probably the only exciting cause of acute rheumatism; secondly, that acute rheumatism may be a cause of simple and malignant endocarditis.

Beyond answering these criticisms the paper adduces the further evidence, recently obtained, connecting a coccus with acute rheumatism, and also throwing some light on the etiology of chronic nontubercular arthritis. No complete exposition, however, of the views of the authors is attempted.

The writers find the organism with great regularity, certainly as often as 10 c. c. of the circulating blood might be expected to yield a growth of an organism situated in certain fixed locations, and, moreover, other investigators are meeting with equal success. With regard to the specificity of the organism, they "know of no other which can be found in the rheumatic lesions of man which will produce similar lesions in animals." While studying the organism the experimenters were accustomed to inject cultures intravenously in order to discover to what forms of arthritis it might give rise. It was found by this means that not only acute articular rheumatism, but also osteo-arthritis (hypertrophic) and periarticular (atrophic) arthritis might be produced by this same organism.

An opportunity was presented for studying a case of rheumatic hyperpyrexia. In this single instance the organism, although successfully isolated, was present in such comparatively small numbers that the authors believe the hyperpyrexia to be a peculiar toxic process rather than an intense bacterial invasion.

The relationship commonly existing between sore throat and rheumatism has long been noted clinically. The authors have carried out some investigations, which seem to show that the tonsils frequently harbor the specific diplococcus and act as an atrium in both acute and chronic infections. As to the therapeutics, they believe that the prevalent view that the salicylates act specifically is an obstructing influence on the study of rheumatism. Finally, they recommend the abandonment of the terms "acute rheumatism," "rheumatic fever," etc., and urge the adoption of some more general term corresponding to "tuberculosis." They suggest "rheumatism."—PASSED ASST. SURG. H. W. SMITH.

MARSHALL, H. W., M. D. **Etiology of chronic arthritis.** John Hopkins Hospital Bull. No. 232.

Inasmuch as chronic arthritis occurs as a complication of many diseases, the author presents a working hypothesis to fulfill these conditions.

He sets forth the result of the action of various etiological elements as seen in familiar pathological changes. The influencing factors are grouped as follows:

1. Changes in quantity and quality of blood supply.
2. Disturbances of sensory and trophic nerves.
3. Mechanical factors.
4. External physical influences.

The theory is proposed that the causes of chronic arthritis are chemical irritants in the blood, disturbances of the central nervous system, mechanical pressures and strains, and external physical stimuli; and that each etiological factor may be a variable quantity; also that joint tissues themselves have a vital resistance of variable degree.

The author then discusses various causes of arthritis:

I. Irritating substances in the blood, chemical products of bacterial growth, chemical products derived from the gastro-intestinal tract, metabolic products from other organs, therapeutic drugs.

II. The influence of the central nervous system.

III. Mechanical irritation to joints.

IV. Various external physical agencies.

Applying the theory to treatment, it has been found that many patients have been improved and some completely cured of severe arthritis by keeping in mind the various etiological factors enumerated.

Treatment should consist in a search for the most probable underlying causes.

Compulsory sedentary life of patients with severe joint disease tend to produce digestive disturbances with the formation of irritating substances; these may get into the circulation and prolong irritation in the weakened joints after original causes have ceased to act. The importance of the digestive tract becomes obvious. Simple modifications of diet, stomach washings, normal saline enemata, and supporting pads for relaxed abdominal walls have already been productive of very great benefit to arthritic conditions in select cases.

Local therapeutic measures should be carried out thoughtfully.

Thermal measures.—Such treatment should be mild at first and discontinued soon if no amelioration takes place, or continued cautiously only as long as symptoms improve.

This working plan accordingly, although not fully established, seems the best method of treatment available at present, and it will

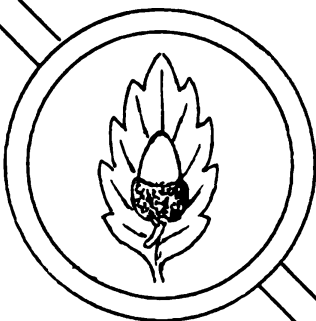
probably be modified and elaborated as data are assembled from cases in which it has been applied.—HOSPITAL STEWARD A. H. EBERLING.

MUMFORD, J. G. Graves's disease. Boston Med. and Surg. Jour., June 2, 1910.

The main points in a somewhat discursive paper are succinctly stated in the author's summary:

1. Graves's disease is due to abnormal activity of the thyroid gland.
2. In advanced Graves's disease, degenerative changes in the thyroid gland may lead to a shifting symptom-complex, ending at last in the positive signs of myxedema.
3. The histology of the gland in Graves's disease indicates shifting, advancing, and retrograding symptoms.
4. An enlarged thymus is nearly always found post-mortem in patients dead of Graves's disease.
5. Advanced Graves's disease may exist without the presence of all the classical symptoms.
6. Graves's disease can nearly always be cured if taken early.
7. The sera of Rogers and Beebe cure a goodly percentage of cases.
8. Through hydrobromate of quinine (neutral), as used by Forchheimer and by Jackson, we find a great percentage of improvements and of cures. It is a pity so few cases have been reported.
9. The great and increasing experience of qualified operators is showing that more than 70 per cent of Graves's disease patients are now being cured by partial thyroidectomy, and the percentage of such cures is rising.
10. Treat the cases seen early by rest, by sera, and by hydrobromate of quinine; if no improvement results in two months, operate by thyroidectomy, and always regard the operation as the surest cure.—PASSED ASST. SURG. H. W. SMITH.

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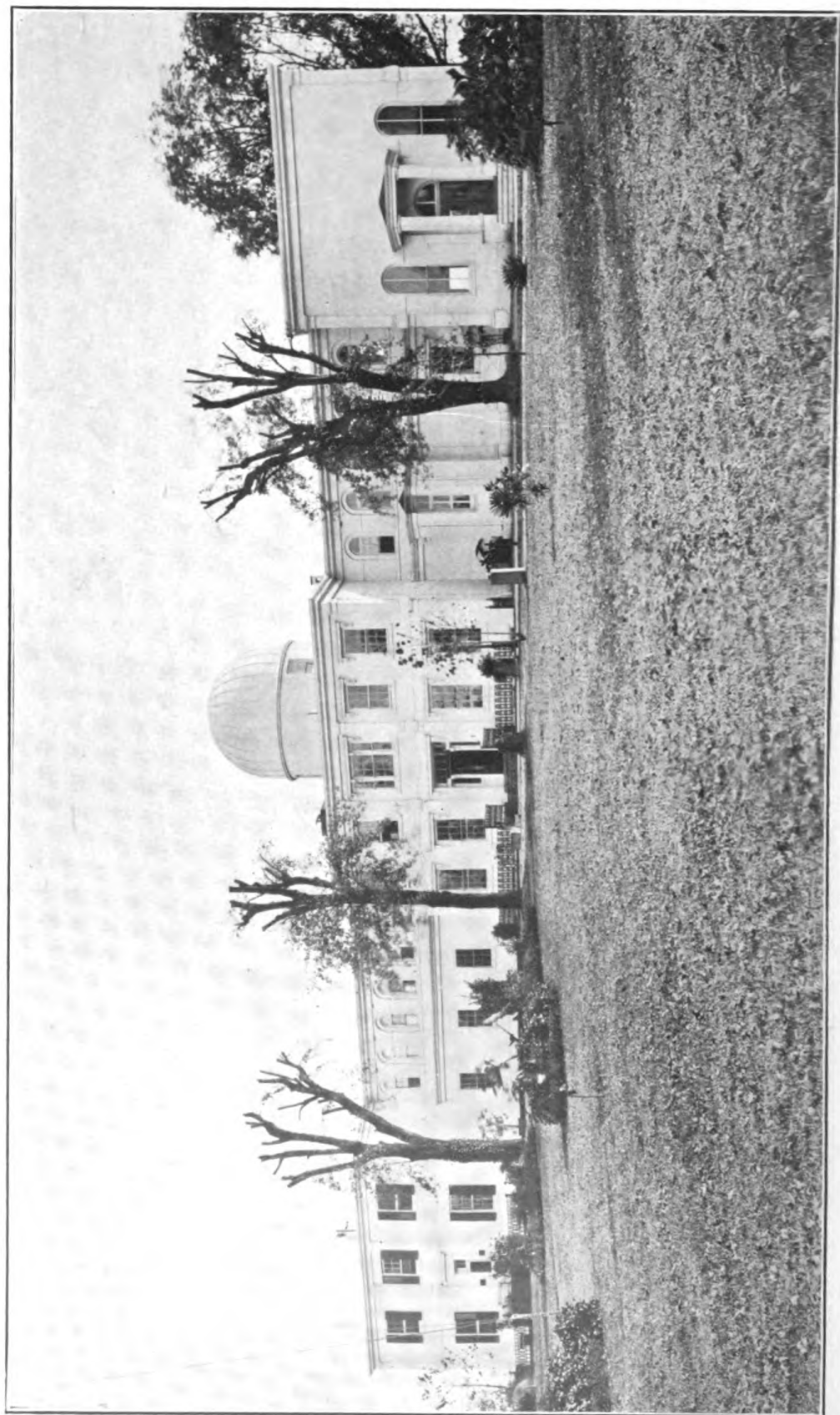


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UNITED STATES NAVAL MEDICAL SCHOOL HOSPITAL.
(Administration building and two pavilions.)



UNITED STATES NAVAL MEDICAL SCHOOL HOSPITAL.
(Rear view of buildings from Potomac Drive.)

INTRODUCTION.

The United States Naval Medical School is a school established by Navy Department's order of May 27, 1902, "for the instruction and training of newly appointed medical officers in professional branches peculiar to naval requirements."

It is indeed that date on which the present school was formally organized and from which it will always date its history, since the several previous attempts at starting such a school had always been rather unsuccessful and the results short lived.

The course of instruction lasts six months, beginning October 1 of each year and consisting of lectures by a well-selected corps of instructors and of practical laboratory work in hygienic chemistry, pathology, bacteriology, and parasitology. Physical and military drills, inseparable from a course of instruction for beginners at a military or naval school are given daily, and continued throughout the course of instruction. Special emphasis is also laid on practical exercises in certain purely professional branches, which experience in the service has shown to be desirable and necessary, as will be seen by a reference to the accompanying syllabus.

As six months is the maximum time that can at present reasonably be spared for the course, it was clearly seen from the very beginning that this school could not assume the function of either a medical college or that of a postgraduate medical school, namely, to overcome the defects of an inadequate medical education. (This is provided for in later years by an additional course, also given at the school, during the spring and summer months of each year.) The course of instruction, following close upon entry into the service, was and still is, on the contrary, primarily intended to prepare an already well-educated medical man for grappling with the problems presented by a rapidly growing naval medical service, and to enable him from the very beginning of his career in the service to assist in solving some of these problems. Hence the instruction given at this school must start where the average medical college leaves off, and hence also the necessity of a preliminary examination required of candidates for entry, and which is designed simply as an inquiry into a candidate's fitness and maturity for taking up the advanced studies offered by the school with promise of future usefulness to the service. Both the preliminary examination and the instruction given

at the school tend mutually to cooperate to the end of preparing young medical men for useful work in the service, and at the same time of inducting them to their specialized vocation on as nearly as possible the same level of efficiency.

The school may be said to have developed from modest beginnings to its present size and importance in harmony with the growing demands on the naval medical service, and these same demands may be expected to determine the direction of its future growth and development. That this school has done good work during the few years of its existence is plainly seen by the accomplishments of its graduates and instructors as recorded in the Surgeon-General's reports and in the Naval Medical Bulletin. With a pardonable pride in what the school has accomplished during its brief history in the past, and judging from its present plans, we are convinced that it promises still greater and better results in the near future.

The course at the Naval Medical School covers the following subjects:

- Tropical medicine.
- Hospital corps drill, tactics, and signals.
- Naval hygiene.
- Duties of naval medical officers.
- Naval and operative surgery.
- Ophthalmology.
- Bacteriology and clinical microscopy.
- Pathology.
- Medical zoology.
- Psychiatry.
- Chemistry, hygienic and clinical.

Regarding the general character of the methods of instruction, it may be stated that the steady aim of the corps of instructors, in both the laboratory and clinical branches, is that the scientific spirit shall predominate.

In publishing the above list of subjects of instruction, with the accompanying synopsis of lectures given at this school during the winter of 1909-10 to the medical officers that had entered the service during the preceding year, it is hoped that medical graduates about to choose a career may recognize in its pages an opportunity and a promise for a high-grade professional life as well as for doing a patriotic duty.

HENRY G. BEYER,

Medical Inspector, U. S. Navy, Commanding.

U. S. NAVAL MEDICAL SCHOOL,

Washington, D. C., September, 1910.

INTRODUCTION TO LABORATORY WORK.

The school building, originally occupied by the Naval Observatory and later by the Museum of Hygiene, has, with slight remodeling and some additions, proved peculiarly adapted to its present purpose. In addition to large, well-lighted laboratories for class work, there are smaller laboratories for the instructors, for the routine laboratory work of the adjacent naval hospital, and for the examination of specimens of interest sent in by medical officers throughout the service.

The class laboratory for pathology, clinical microscopy, bacteriology, medical zoology, etc., contains 26 working places, each consisting of desk with plate-glass top set on rubber matting and supplied with microscope and accessories, gas, electric light, and water. Outside of this laboratory is a large 37° C. incubator, with a separate compartment for each student. There are also incubators kept at a constant temperature of 20° C. and ovens run at 60° C. In the basement is a cold-storage room kept constantly at a temperature just below freezing.

The chemical laboratory contains 32 working places, with all the requirements for clinical chemistry, and for examination of milk, water, air, etc.

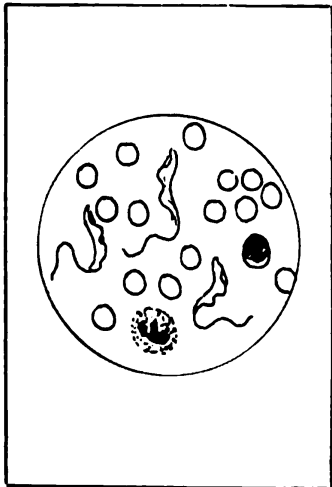
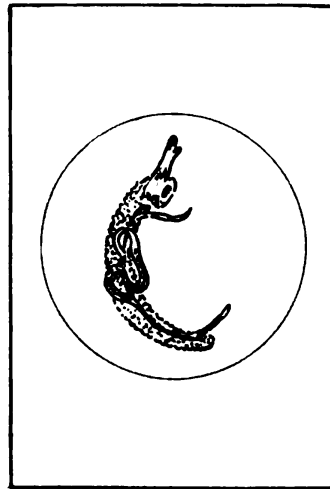
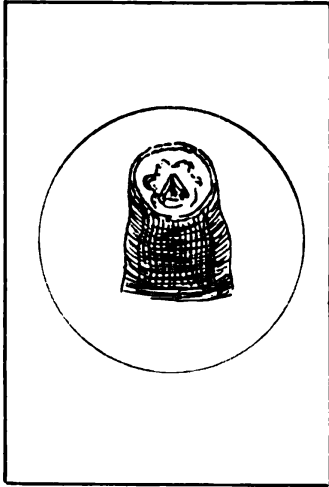
A complete equipment for photomicrography has recently been installed in a specially constructed room in the basement.

An animal house is run in connection with the laboratory.

In the museum the classified material already at hand covers most of the subjects dealt with in tropical medicine and parasitology. This material is now being provided with ample shelves in a specially fitted room, and a systematic arrangement has been perfected by which it is expected to rapidly fill gaps in the various collections and to replace the specimens constantly consumed in class-room work by material directly from the Tropics, through naval medical officers and others working in tropical regions.

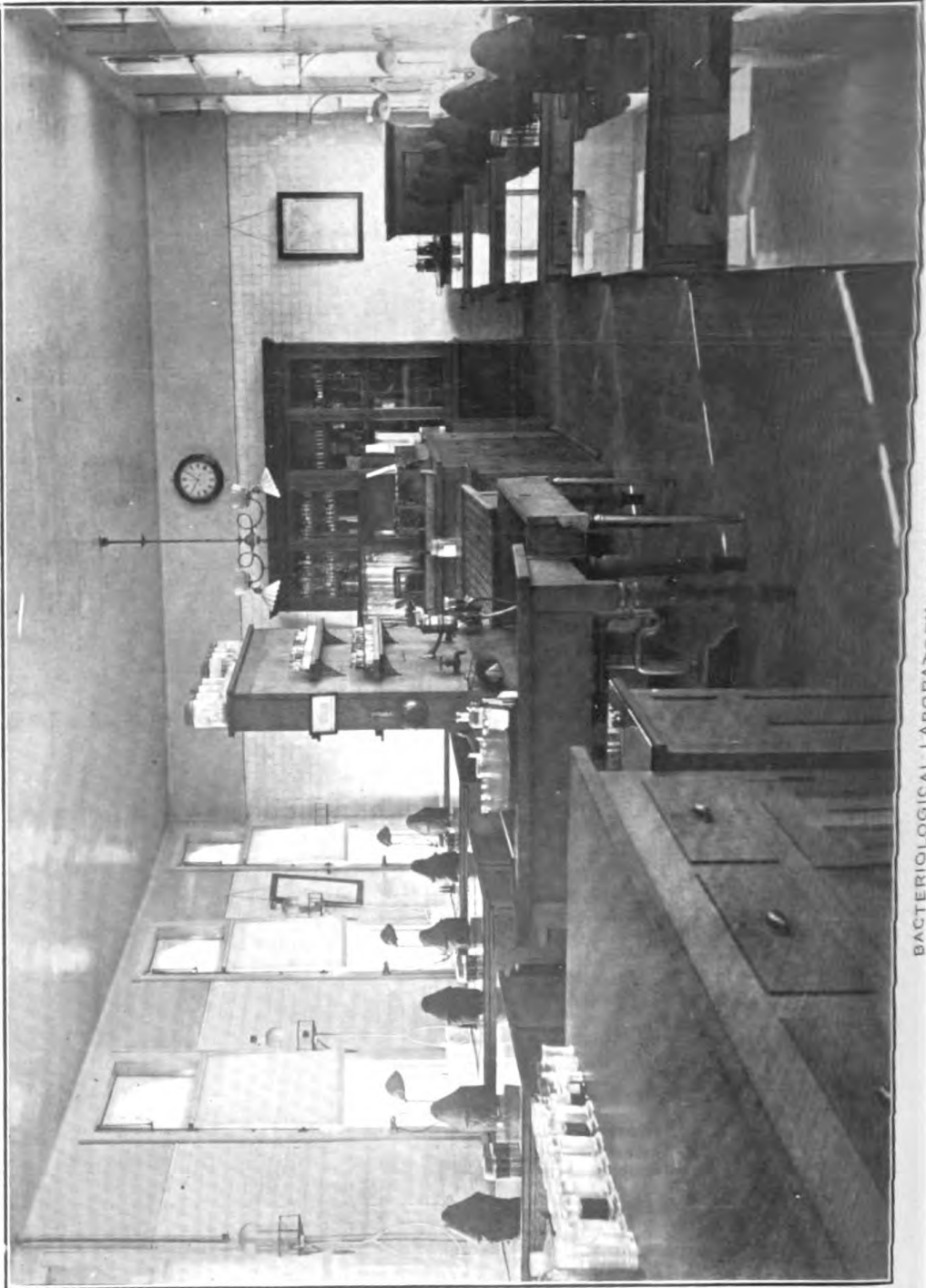
The library contains, in addition to standard works on medicine and surgery, the leading domestic and foreign medical periodicals, especially those dealing with medical zoology, pathology, bacteriology, and tropical diseases.

There are two systematic courses given during the year: (1) One lasting from October 1 to the latter part of March for those assistant surgeons appointed since the preceding October. (2) A shorter course, beginning in April, affords to older medical officers of the navy an opportunity to familiarize themselves with recent advances in professional work, and particularly with the newer and more widely accepted laboratory methods and technique.—SURG. C. S. BUTLER, U. S. N.



AM-EBBLING 1910

TROPICAL MEDICINE AND PARASITOLOGY.



BACTERIOLOGICAL LABORATORY FOR STUDENT OFFICERS.

I. TROPICAL MEDICINE.

The student of medicine, when graduating from his medical school, should have a cosmopolitan rather than a provincial idea of diseases. By this it is meant, not that he should know less about the diseases of temperate climates or of the locality in which it is presumed he will practice, but that he should also have some idea, academic though it may be, of the diseases peculiar to other parts of the world. It is from lack of application of this principle that it is possible for us to live for generations with such diseases as pellagra and ankylostomiasis in our midst and yet not recognize them.

"The peculiarities of tropical medicine are etiological rather than pathological." If the question of etiology were taught in its broad rather than in its provincial sense, much of the teaching in schools of tropical medicine could be dispensed with. As conditions exist, however, schools of tropical medicine were established in many of the larger cities of the world in order to meet a distinct want. They have overcome a defect and have been responsible for much of the progress which medicine has made during the past two decades.

It is necessary that the medical officer of the navy get the cosmopolitan idea of diseases. He goes into all the ports of the world and is called upon to examine and to treat men who may recently have cruised in remote parts of the globe. He may serve at one time in a naval hospital in the Tropics, at another as the medical officer of an expedition operating anywhere between the equator and the poles. It is therefore essential that the naval medical officer have the open mind in diagnosis, and that he know the accepted facts and limitations of our knowledge in the matter of exotic diseases. Furthermore, the exigencies of naval life make professional isolation for the medical officer a frequent occurrence, and consequently he must be his own specialist in several lines of work.

The best foundation for the student who will have to deal with questions of tropical medicine is the acquirement of "a practical grasp of the problems of clinical bacteriology and a working knowledge of animal parasitology."

Candidates entering the Medical Corps of the Navy show different degrees of preliminary training in the several branches which are supposed to constitute a physician's education. Some show effective instruction in laboratory branches, while with others this knowledge is not so good. It is the purpose of this school to fill in these deficiencies and start the men, so to speak, on an even keel in

their naval career. The course in tropical medicine, or more properly perhaps in what the French call "*pathologie exotique*," was instituted here in view of the need above indicated. It was the first of its kind in the United States.

In another part of this announcement the courses in bacteriology, parasitology, and hygienic chemistry are outlined. The course in tropical medicine aims to supplement these courses and to give the medical, pathological, and epidemiological aspects of tropical infections, whether caused by bacteria, protozoa, fungi, or helminths. To this end the instruction is given under three headings: (1) Didactic lectures; (2) laboratory work; (3) clinical instruction.

In the *didactic lectures* the accepted facts of tropical pathology, the geographical distribution of diseases and their epidemiology and treatment, are outlined in the lecture room. These lectures are supplemented by lantern demonstrations and frequent quizzes to ascertain the weak points in the student's comprehension of these subjects.

In the *laboratory work* in tropical medicine the great importance of the blood and feces in diagnosis is emphasized, and practical work in these two subjects is given at frequent intervals. By the study of free living protozoa the morphological characteristics of the parasitic ones can be learned, and by the study of the parasitic protozoa of animals such as trypanosomes, spirochaetes, proteosoma, and the ciliates of the frog's intestine the student's judgment of proportion, of staining qualities, and of any characteristic motility is developed. He learns to be wary of artefacts and to retain his composure when he "discovers" a blood platelet superimposed on a red blood cell. Where protozoa are cultivable the best media for this purpose and the technique of culture are given in the laboratory. The different species of human malarial parasite and the blood changes in malaria are shown by fresh and stained films. The tissue changes produced in the various tropical conditions are shown by microscopical sections and, where practicable, by gross specimens.

Laboratory work on arthropods, as outlined elsewhere, is given. Thus mosquitoes, fleas, flies, bedbugs, lice, ticks, and mites come in for due consideration.

Clinical teaching.—While true that patients suffering from tropical diseases are not as common in United States ports as in such a port as London, which is the center of a large cosmopolitan commerce, it is nevertheless a fact that, owing to the wide range of our climate, we have a considerable variety of clinical material of this kind. Our merchant marine plying between United States ports and the Tropics is as yet comparatively small, hence the supply of clinical material from this source is insignificant, and clinical teaching with a variety of cases is not possible at any one place. Naval hospitals in the United States get, however, in the course of each year a certain

amount of such material. Thus, in the naval hospital at Washington it is nearly always possible to show the class in their course of instruction here cases of malaria, of ankylostomiasis, of amœbic dysentery, and perhaps of liver abscess. By contrasting conditions common in temperate regions with those with which they could be confounded in the Tropics, it is virtually possible to hold a clinic upon the particular disease in question. A syphilitic eruption can serve to point out how a yaw eruption would differ, a neuritis to picture a case of beriberi, a case of jaundice, with bile in the urine, to illustrate the differential points in yellow fever and tropical hemoglobinuria. It is thus possible to do a great deal in teaching practically the subject of tropical diseases, though it is recognized that the ideal clinic can not be gotten outside some of the larger cities in the Tropics.

A good understanding of the wide range of causes operating in warm countries to produce disease, a practical knowledge of bacteriology and parasitology, and the proper amount of interest and earnestness will enable the student to readily acquire the clinical training when the opportunity presents. Without these he never will acquire it, even though the opportunity does present itself.

The methods of teaching in this school are largely due to the efforts of Surg. E. R. Stitt, U. S. Navy, whose sound ideas on matters of tropical medicine can not be questioned.

The following is an outline of the work covered in the course on tropical medicine:

1. Histology and pathology of the blood.
2. Hæmoglobinometry and blood corpuscle counting.
3. The malarial parasites of human and other blood.
4. Development of the malarial parasite in the mosquito.
5. Biology of the mosquito.
6. Pathological anatomy of malaria.
7. Black-water fever.
8. Detection of blood, urinary pigments, quinine, etc., in urine.
9. Malarial prophylaxis and treatment.
10. Trypanosomes and trypanosomiasis of man and animals. (Sleeping sickness, nagana, surra, etc.)
11. Kala-azar and Delhi boil.
12. Spirochaete diseases.
13. Yaws and Verruca peruviana.
14. Yellow fever.
15. Dengue.
16. Filarial diseases.
17. Ankylostomiasis.
18. Bilharziasis.
19. Paragonomiasis.
20. Myiasis.
21. Dysentery and its causes; tropical intestinal disturbances; liver abscess.
22. Pellagra.

23. Madura foot and tropical mycotic skin diseases.
24. Beriberi and scurvy.
25. Plague.
26. Leprosy.
27. Malta fever.
28. Typhus and Rocky Mountain spotted fever.
29. Cholera.
30. General and special tropical hygiene.
31. Methods for preserving tropical laboratory material, such as biting flies, fleas, mosquitoes, pathological tissues, worms, etc.

With the several laboratory courses the endeavor is made to have them complementary as far as possible, so that there will be no overlapping.

PATHOLOGY.

The course in pathology embraces the methods of preparing tissues for sectioning, section cutting, and the various methods of staining such sections.

A complete review of all pathological processes is carried out by the study of microscopical sections from such tissues.—SURG. C. S. BUTLER, U. S. N.

II. MEDICAL ZOOLOGY.^a

Systematically, the work in medical zoology is considered under four heads, namely: (1) The pathogenic protozoa; (2) parasitic worms; (3) insects and other arthropods in their relations to disease; (4) venomous snakes.

These subjects are considered more particularly from the zoological, rather than the clinical, viewpoint, many of the diseases concerned being left for fuller treatment in the course in tropical medicine (q. v.).

The course of study is taken up in two ways: First, an illustrated lecture course, which aims to give the student a general, comprehensive, and more especially a well-systematized understanding of the subjects covered in the course; second, a practical laboratory course, which furnishes the student an opportunity to acquire familiar and intimate knowledge of the different organisms dealt with.

LECTURE COURSE.

In outline the weekly lectures cover the following subjects:

1. *Introductory*.—The animal kingdom; principles of zoological classification and nomenclature; terminology; zoological characters and relations of the larger groups; medical relations of the lower animals to man; parasitism, the principles governing parasitic relations between organisms, hosts, intermediate hosts; alternation of generations and life cycles; the animal parasites of man.

2. *The protozoa*.—Zoological characters and classification of the protozoa.

The sarcodina.—General characters and classification.

The general morphologic characters of amœbæ; their physiologic and reproductive processes; the parasitism of amœbæ; parasitic amœbæ of man. (*Entamœba*, *Paramœba*, *Leydenia*.)

The mastigophora.—The general characters and relations of flagellate protozoa and their classification. The flagellate parasites of man—*Protomastigina*: *Cercomonas*, *Bodo*, *Monas*; *Polymastigina*: *Trichomonas*, *Lambliæ*; *Binucleata*: *Trypanosoma*, *Leishmania*, *Plasmodium*, *Trepanæma*.

^a For a number of years Doctor Stiles has generously given his services to the Naval Medical School, conducting a lecture and laboratory course in medical zoology. This arrangement still continues, but recent changes in Doctor Stiles's work necessitate his absence from Washington a part of the time. Doctor Stiles and Doctor Garrison now conduct the course together, the latter giving the laboratory instruction and having charge of the work during the absences of the former.

The sporozoa.—The morphology, physiology, and reproductive processes of the sporozoa. Classification of the sporozoa. The sporozoan parasites of man.—*Coccidiidea: Eimeria; Sarcosporidia: Sarcocystis; Sporozoa inquirenda*; uncertain organisms described in various diseases.

The ciliata.—General characters, relations, and classification of ciliates; ciliates as parasites; the ciliate parasites of man—*Balantidium, Nyctotherus*.

3. *The vermes.*—Classification of vermes; the parasitic groups of worms; *Platyhelminthes* and *Nemathelminthes*:

Trematoda.—Morphology, physiology, and reproductive processes of the flukes; the trematode parasites of man; the *Monostomida*; the *Paramphistomida*; the *Fasciolida*; the *Schistosomida*. Trematode infections reconsidered from the viewpoints of topographical and of geographical distribution. The clinical and hygienic side of trematode infections.

Cestoda.—The morphology, physiology, and reproductive processes of tapeworms. The cestode parasites of man.

The *Dibothriocephalida*; the *Tæniida*, *Hymenolepidida* (*Hymenolepidina*, *Dipylidiina*), the *Davaineida*. Tapeworms reconsidered from the viewpoint of geographical distribution and source of infection. The clinical importance of cestode infections.

Nematoda.—Morphology, physiology, reproduction, and classification of the roundworms. Parasitism among the roundworms. The nematode parasites of man.

The *Anguillulida*, the *Angiostomida*, the *Gnathostomida*, the *Filariida*, the *Trichinellida*, the *Strongylida*, the *Ascarida*. Reconsideration of the nematodes from the viewpoint of topographical and of geographical distribution and source of infection. The clinical and hygienic importance of roundworm infections.

4. *Medical entomology.*—Arthropods as pests, as parasites, as carriers of pathogenic organisms, as hosts of the parasites of man.

Classification of the Arthropoda. The Arthropods of interest in medicine.

Arachnida.—The morphology, biology, and classification of the ticks and mites.

Trombidida, *Gamasida*, *Tyroglyphida*, *Sarcoptida*, *Demodicida*, *Ixodida*, *Argasida*.—The medical importance of ticks.

Linguatulida.—*Linguatula*, *Porocephalus*.

Insecta.—The general morphology, biology, and classification of insects.

Siphunculata; *Pediculus*, *Phthirus*, *Hemiptera*; *Cimex*, *Redurius*, *Conorhinus*, *Diptera*; *Culicida*, *Simulida*, *Tabanida*, *Sarcophagida*, *Muscida*, *Pulicida*.—The medical importance of lice, mosquitoes, flies, and fleas.

5. *Venomous snakes.*—One or two lectures, with lantern slides and demonstration of specimens, dealing with the anatomical characters, habits, and geographical distribution of the venomous snakes of the world, especially describing the characters necessary for their recognition, and reviewing the serum and other recognized methods of therapy.

LABORATORY WORK.

While in the lecture hall a systematic presentation of the subject is one of the essentials aimed at, in the laboratory the chief endeavor

is directed toward acquiring familiarity with practical methods of laboratory work in the various groups of organisms studied and such a working knowledge of the organisms themselves as will enable the student to do independent diagnostic and determinative work.

The success of such a course depends necessarily upon the abundance of available material. For purposes of presentation, therefore, the work of the class in the laboratory may be divided according to the material upon which the different lines of work are based, though all the work is carried along simultaneously three hours weekly throughout the course.

1. *Animal autopsies*.—The proximity of the city pound to the school makes it possible to secure an unlimited supply of dogs and cats immediately after they are killed. In addition, a plentiful supply of wild rats is obtainable from the city barns and markets. It has been customary each year to have the class devote two or three laboratory periods to the study of fresh material obtained from these animals. During the coming year it is proposed to carry this work further and by dividing the class into groups to have several animals autopsied each week. A careful, systematic autopsy is insisted upon in every case, the ecto-parasites being first collected and the animal then opened and each tissue and organ examined for possible parasites. The parasites found are preserved and labeled and later prepared and examined. In such a course of work the student can not fail to acquire familiarity with the technical methods employed and a practical knowledge of the parasites of the animals examined. This study of the closely related parasites of dogs, cats, and rats serves practically every purpose that would be gained by the actual study of the species parasitic in man, and the abundance of material available avoids the difficulty encountered even in the Tropics when it is attempted to confine the work to the parasites of man alone.

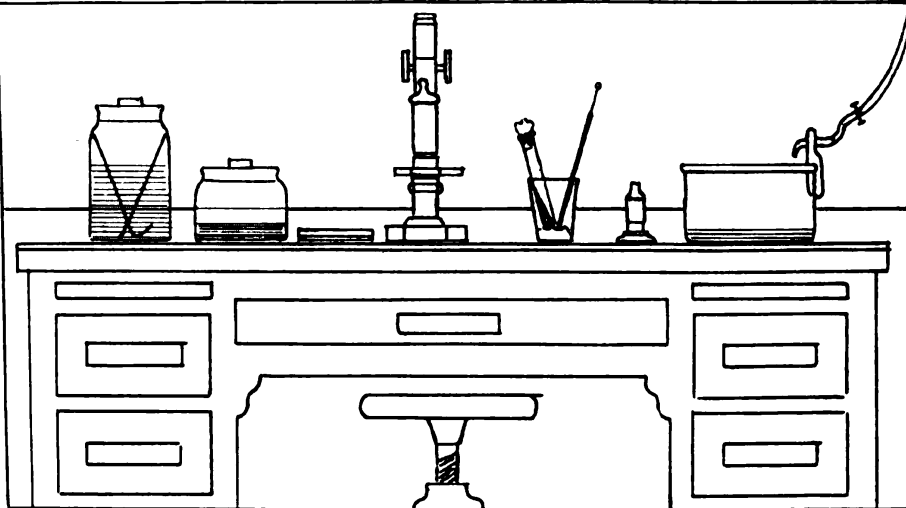
2. *Recognition of the ova of parasitic worms*.—In view of the fundamental importance to the medical man of a thorough familiarity with the appearances of the ova of parasites in the body excretions, a thorough drill in the microscopic examination of feces, urine, and sputum is made a special feature of the laboratory course. With the exception of a few rare forms, the helminthological collection of the school contains specimens of the ova of all the parasitic worms of man, and new material is continually being received from Panama, the Philippines, and other tropical localities. Each student examines at least one specimen for ova at each period. In addition to the preserved material, specimens from cases at the Naval Medical School Hospital and from the animals autopsied are available for this work.

3. *Study of the parasitic worms of man.*—In conjunction with the lecture course and along with the work on fresh material from animals, the student studies preserved and mounted specimens of practically all species of worms parasitic in man. In many cases it is possible, and considered desirable, that he stain and mount his own material. Through the kindness of the custodian of the National Museum Helminthological Collection (Doctor Stiles), it is possible for the school, for purposes of demonstration, to supplement its own material by specimens from that collection.

4. *Experimental and special work in helminthology.*—During the course experiments are conducted with the class, illustrating certain of the biological processes studied in parasites, such as the transmission of trichinosis from animal to animal, the life cycle of *Taenia crassicolis* in cats and mice, the development of ova, etc.

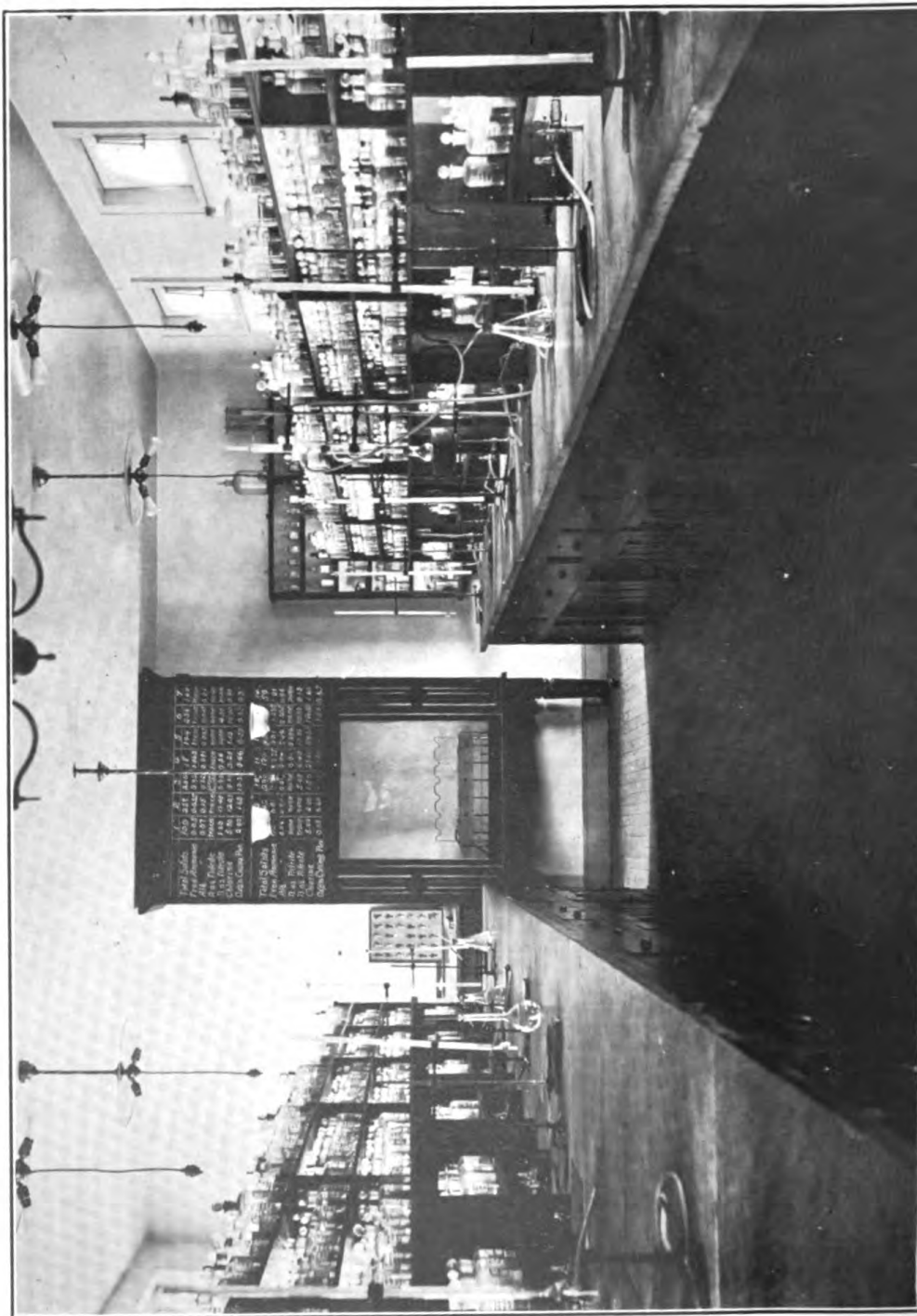
While it is required that each student cover the entire course of study, an opportunity is given for any member of the class, upon approval of the faculty, to make a special study of certain organisms or to take up a certain problem experimentally, instead of dividing his time equally among all subjects.

5. *Study of arachnids and insects.*—Several exercises are given in the laboratory in studying mounted specimens of mosquitoes, ticks, fleas, flies, and lice, and in the dissection of fresh material. The aim of this study is to give the student such a working knowledge of the characters used in the classification of arthropods as will enable him to use keys for the determination of the various genera and species which are of importance in medicine. The arthropod collection contains specimens representing most of the interesting groups, and this is supplemented by the material obtained by the students from dogs, cats, and rats which are autopsied.—CH. WARDELL STILES, PH. D., D. SC., AND PASSED ASST. SURG. P. E. GARRISON, U. S. N.



BACTERIOLOGY.

AMESLING.



CHEMICAL LABORATORY FOR STUDENT OFFICERS.

III. BACTERIOLOGY.

1. *Lectures.*—The first few lectures in the course of bacteriology are devoted to a consideration of bacteria in general, their morphology, biology, and classification. The various methods of cultivating bacteria, microscopic methods of examination, general bacteriological diagnosis, and the importance of and the indications for animal inoculation are discussed.

The question of immunity is then taken up and carefully studied. The various theories of immunity are explained and the different phases, with their relation to health and disease, are emphasized.

Certain of the more important pathogenic organisms are next studied in detail, special attention being given to bacteriological procedures of diagnostic importance, methods of transmission, and the present status of the immunity and serum therapy work in connection with the disease in question. In this manner most of the important pathogenic organisms are given careful consideration, and the student is given an understanding of the uses and limitations of serum therapy and prophylactic inoculations.

During the course of the year lectures are given on special subjects by officers of the Public Health and Marine-Hospital Service on duty at the Hygienic Laboratory. During the past year the following such lectures were given:

"Typhoid fever; methods of transmission in the District of Columbia," by Passed Asst. Surg. L. L. Lumsden, U. S. P. H. and M. H. S.

"Anaphylaxis," by Passed Asst. Surg. J. H. Anderson, Director of the Hygienic Laboratory, U. S. P. H. and M. H. S.

"Vaccine virus; method of preparation, examination, and control by the Government," by Passed Asst. Surg. J. H. Anderson, U. S. P. H. and M. H. S.

"Diphtheria and tetanus antitoxine; method of preparation, standardization, and control in the United States," by Passed Asst. Surg. J. H. Anderson, U. S. P. H. and M. H. S.

"Quarantinable diseases," by Asst. Surg. Gen. L. E. Cofer, U. S. P. H. and M. H. S.

2. *Laboratory course.*—The purpose of the laboratory course in bacteriology is to prepare the student to enter a laboratory and carry out the various bacteriological procedures necessary in the operation of the better clinical laboratories.

(1) The preparation of media is of the greatest importance, and for this reason the student is given practical work in making the

more common culture media. Broth is prepared from **fresh meat** and also from meat extract. The importance of adjusting the reaction is impressed upon the student, and the technique is practiced and mastered. Gelatin and agar are next prepared in the laboratory. The preparation of other media, such as litmus milk, litmus sugar broths, potato, etc., is explained to the student. Various methods of sterilization are demonstrated and the reasons for using certain methods with certain media are explained.

(2) The student then studies thoroughly the technique of staining with the simple anilin dyes and the use and importance of the Gram method of staining. The kinds and degrees of motility are studied in the hanging drop and the importance of motility in the classification of bacteria is emphasized.

In this connection the various yeasts and molds are studied and the importance of pathogenic types is considered.

Methods of plating are next studied. The student is given a broth culture, and by examination of a hanging drop and actual experience in plating a practical knowledge of diluting is obtained which enables him to make a satisfactory workable plate. The general characteristics of growth upon various media are carefully studied, in order to give a good vocabulary for use in later work.

(3) Practical work is given in the classification of organisms into the various genera and species, and, if possible, the organism is ultimately identified. A tube containing two or more organisms is given to the student. Plates are prepared and the organism isolated and identified according to keys. The identified organism is inoculated into animals and, in suitable cases, obtained again from the heart blood. This work is continued until a good practical knowledge is acquired of the methods of isolation and identification preliminary to the study of the specific infected substances, such as pus, feces, urine, etc.

(4) The feces and urine are studied with special reference to the typhoid bacillus and the recognition of typhoid bacillus carriers. Continued practical work is given in the preparation and use of the Endo and Conradi-Dragalski media and the various sugar media. Isolation and differentiation of the other organisms which might be confused with the typhoid bacillus is required. The typhoid bacillus is in each case ultimately identified by the use of immune sera in microscopic and macroscopic preparations.

(5) The bacteriology of pus, sputum, and the secretions of the nose, throat, and conjunctiva is considered, special attention being given to the diphtheria bacillus. The technique of blood cultures and methods of identifying the organism obtained are practiced.

(6) The bacteriology of water and milk is carefully studied and the standards of condemnation and acceptance are applied to un-

known specimens, which are given to the class for examination. In connection with this work, one forenoon is spent at the filtration plant of the city of Washington and a visit is made to the laboratory and operating plant of a large milk establishment.

The examination of air by bacteriological methods is briefly considered.

(7) Work on immunity is done in the laboratory. Hemolytic sera are prepared and used by the student in the clinical procedures in which they are indicated. Each student is given a mixed culture of bacteria from which he isolates a designated organism and prepares and standardizes a vaccine. With this vaccine he makes injections into an animal and finally determines the agglutinating titre of the serum obtained.—PASSED ASST. SURG. O. J. MINK, U. S. NAVY.

IV. HYGIENIC AND CLINICAL CHEMISTRY.

Instruction in hygienic and clinical chemistry is given both through the medium of lectures and by means of laboratory demonstration and practice.

Owing to the breadth of the subject and the short period of the school term no attempt is made to give a systematic course of lectures in theoretical chemistry, although the lectures given early in the term are devoted to an explanation of atomic and molecular relations and the properties and reactions of the simpler and more commonly used inorganic compounds. It is during the course of these lectures that every effort is made to fully develop the theory of volumetric analysis, a very fair knowledge of which is so necessary if the advantages of the chemical laboratory are to be utilized as an aid in diagnosis or to determine the progress of disease.

The remaining lectures are somewhat individual in character, some dealing with the chemistry of the products of the normal being and of the various pathological conditions, while others treat of the chemistry of substances commonly used in the general practice of medicine.

As many of the analytical processes used in connection with medical work are to be understood only from a detailed discussion of the chemical changes involved, the explanation of these serve as an aid to the lectures proper as a means of instruction.

The object of such a series of apparently disconnected lectures is to more intimately acquaint the student with that portion of chemistry which is of importance to the physician and particularly to the naval medical officer.

Since the exigencies of the service permit of but a limited equipment for work of this character it necessitates the selection of those methods of examination which involve the use of the simplest apparatus only. This compels the adoption of and instruction, in some instances, in processes that would not be generally used in a fully equipped laboratory. In the selection of these methods, however, care is always taken that accuracy is not materially sacrificed for simplicity.

The instruction in the laboratory is divided into a series of periods, each being devoted to the study of and experiment with some particular product. The periods as at present arranged are as follows:

(a) *Volumetric analysis*.—This includes the preparation, use, and relations of volumetric solutions, especially those that are used in connection with the study of the composition of excreta, etc.

(600)

(b) *Examination of air.*—It is the estimation of the CO_2 that receives special attention, although demonstrations of the manner in which the quantity of oxygen and other ingredients can be estimated or demonstrated are given.

(c) *Water analysis.*—The usual sanitary analysis only is taught. The instruction is made as complete as possible and is supplemented by the submission of samples of water from various sources and the character of which has previously been determined. It is from the results of these analyses that instruction in the manner of determining the probability of pollution is given.

(d) *Analysis of food material.*—Methods for the determination of the moisture, ash, fat, carbohydrate, and protein are given. With the exception of the analysis of milk, of which all must have a fair knowledge, the work in this field is intended only to demonstrate in a general way how the quantity of the various ingredients are determined. In connection with this branch, methods for the detection of the more common food preservatives are given.

(e) *Urinalysis.*—A sufficiently large number of samples of known composition are submitted to the students for qualitative and quantitative examination to afford enough practical experience to insure the highest degree of proficiency. The instruction includes the detection of the various pigments, albumins, sugar, acetone, etc., and the estimation of albumin, sugar, urea, ammonia, etc., and also the methods of obtaining such other reactions and estimations as might be of any value to the physician.

(f) *Examination of gastric material.*—This is made as complete as that of the urine, especial attention being given to the determination of the relative value of the various methods in common use in investigating the composition of specimens. In addition to this the reactions and the methods for the separation of the proteins are studied.

(g) *Poisons.*—The reactions and methods for the detection of the more common alkaloids and other common poisons are studied only in a minor degree, for this portion of the course is intended only to give the student an idea of the care and precautions that such work requires, so that mistakes in the preparation of samples for such an examination can be avoided.—PHARMACIST E. B. NOYES, U. S. NAVY.

V. LECTURES ON NAVAL HYGIENE.

LECTURE I.

Definition of naval hygiene; bibliography; **evolution of the naval vessel**; naval hygiene in the past; vital statistics and damage from disease in the naval service.

LECTURES II AND III.

The modern naval vessel, structural characteristics; general topography and description of principal types.

LECTURES IV AND V.

The ship's surroundings, the sea, and outside atmosphere; influence of ship's movement, noises, and vibrations.

LECTURES VI AND VII.

The air within the ship; ventilation; temperature and humidity.

LECTURES VIII AND IX.

Illumination, natural and artificial; eye strain.

LECTURES X AND XI.

Water and water supply; storage; ice, refrigeration, and cold storage; drainage and flushing systems.

LECTURES XII AND XIII.

Food supply; the navy ration; preparation of food; messing arrangements; cooks and cooking; cooking utensils; the galley.

LECTURES XIV AND XV.

Clothing and bedding; storage; laundering and washing; cleanliness of personnel; bathing; wash rooms and showers.

LECTURES XVI AND XVII.

Ship routine; work, rest (sleep); recreation; care of the sick; moral influences.

LECTURES XVIII AND XIX.

Disinfection and disinfectants; general and special prophylaxis; infectious diseases on shipboard.

LECTURES XX AND XXI.

Recruiting; methods employed; requirements for special ratings; acclimation to sea life; physical training.

LECTURES XXII AND XXIII.

Sanitation and sanitary duties on shipboard and in camp.

LABORATORY WORK IN NAVAL HYGIENE.

Examination of air, water, and food; estimation of ventilating efficiency on shipboard; practical work in disinfection.—SURG. F. L. PLEADWELL, U. S. NAVY.

VI. DUTIES OF MEDICAL OFFICERS.

LECTURES 1 AND 2.

I. Placing a ship in commission :

(a) Orders to duty ; how received and obeyed ; **to whom presented ; uniform ; baggage ; assignment to quarters ; mess routine ; personal relations with messmates ; dealings with enlisted men ; discipline ; customs of the service.**

(A) The senior medical officer—

(b) Taking charge of the medical department ; **inspection of accommodations for the sick ; storerooms, etc. ; examination of crew ; vaccination ; sick call ; daily routine ; surgeon's division ; etc.**

(c) The medical outfit ; invoices and receipts ; **storage of medical supplies ; timely requisitions for additional stores ; custody of spirits ; loss of stores ; survey of stores ; transfer of stores ; on going out of commission ; etc.**

(B) The junior medical officer—

General duty ; attention to the sick and responsibility ; relation to senior medical officer ; special duties ; etc.

II. Special duties afloat :

- (a) Contagious diseases.
- (b) Bills of health and quarantine.
- (c) Sanitary inspections and recommendations.
- (d) Sanitary reports.
- (e) Board duty and court-martial duty.
- (f) First-aid instruction.
- (g) Emergencies.
- (h) Examination of eyesight of gun pointers.
- (i) Hospital ships.

LECTURES 3 AND 4.

I. The medical journal (for ships, navy-yards, and shore stations, not hospitals) :

(a) Senior medical officer ; responsible for accuracy and neatness of journal ; if kept by junior, to be approved ; no one else to make entries in.

- (b) Functions of journal; medical histories; sanitary history; professional record; pensions; promotions; retirements; sanitary recommendations; record of all reports, surveys, post-mortem examinations; trivial cases; prescriptions; rough journal.
- (c) Instructions for keeping—
 1. Opening entry (on going into commission).
 2. Origin of disabilities.
 3. Diseases not symptoms.
 4. Indexing.
 5. Order of names.
 6. Change of diagnosis.
 7. Admissions.
 8. Deaths.
 9. General duties.
 10. Day's record.
 11. Expenditures.
 12. One-day patients.
 13. When completed.
 14. Prescription book.
- (d) Special entries—
 1. Intoxicants, etc.
 2. Sanitary recommendations, etc.
 3. At shore stations, indorsements, etc.

LECTURES 5 AND 6.

I. General duties afloat:

- (a) Sick call, how conducted, etc.
- (b) Quarters, duties at.
- (c) Drills.
 1. Ordinary routine.
- (d) General quarters.
 1. Signal for.
 2. Station at.
 3. Organization for.
 4. Equipment for, etc.
- (e) Clear ship for action.
- (f) Fire drill.
- (g) Collision drill.
- (h) Fire and rescue party.
- (i) Arm and away.
- (j) Abandon ship.
- (k) Man overboard.
- (l) Landing parties.
- (m) Hospital boat.

LECTURES 7 AND 8.

- (a) At navy-yards.
 1. Control of **work** and employees.
 2. Pay rolls.
 3. General duties as medical officer.
 4. Attendance on families.
 5. Injured employees (civilian).
 6. Daily sick report.
 7. Examination of recruits and candidates for appointment.
 8. Application for pension.
 9. Duties of junior medical officer.
 10. Monthly sanitary reports.
 11. Navy-yard quarters; routine; rules; etc.
- (b) Recruiting.
 1. Order and expense account.
- (c) Board duties.
 1. Inspection and survey.
 2. Examining, promotion, and retiring.
 3. Boards of survey, personnel, and material.
 4. Boards of inquest.
 - (a) Authorization.
 - (b) Composition.
 - (c) Oaths not authorized.
 - (d) Duties of procedure.
 - (e) Opinion of medical officer required.
 - (f) Making up reports.
 - (g) Procedure in cases of suspected violence.
 - (h) Form of procedure.
- (d) Representation at medical congresses.
- (e) Duty at naval hospitals.
 1. Reporting.
 2. The medical officer in command.
 3. The supervisory surgeon.
 4. The medical officer of the day.
 5. Daily routine.
 6. Forms to be observed on receipt and discharge of patient.
 7. Daily journal.
 8. Uniform.

LECTURES 9 AND 10.

- (a) Surveys on the personnel.
- (b) Surveys on material.
- (c) Medical attendance.
- (d) Funeral expenses.
- (e) Death certificates.

LECTURES 11 AND 12.

- (a) Sanitary regulations.
- (b) Sanitary reports.
 - 1. The commander in chief.
 - 2. The fleet surgeon.
 - 3. The captain.
 - 4. The senior medical officer.
 - 5. From shore stations.
 - 6. From ships.
- (c) Sanitary instructions afloat.
- (d) Sanitary instructions ashore.

LECTURES 13 AND 14.

- I. The medical department in battle.
 - (a) Aboard ship.
 - (b) On shore.

LECTURES 15 AND 16.

Blank forms.
 Reports and returns.
 The fleet surgeon.
 The naval hospital fund.
 The navy pension fund.
 The Geneva Convention.
 The Hague Peace Conference.
 The Naval Hospital, Las Animas, Colo.
 The Army and Navy General Hospital, Hot Springs, Ark.
 The Government Hospital for the Insane.
 The Mendocino State Hospital, Ukiah, Cal.

LECTURES 17 AND 18.

The Hospital Corps.
 The Nurse Corps.

LECTURES 19 AND 20.

Supplies or services.
 Public bills.
 Vouchers.
 Requisitions.
 Miscellaneous topics of interest to naval medical officers—

- (a) Question of line of duty in injuries received on shore while engaged in legitimate physical exercise.
- (b) Consultation with specialists; how arranged.

- (c) Reimbursement for dental services and for eyeglasses; when are they a charge against Government?
- (d) Right of resignation in time of peace.
- (e) Can an enlisted man or officer decline to submit to medical or surgical treatment?
- (f) Determination of line of duty in the absence of medical officer.
- (g) Line of duty.—SURG. F. L. PLEADWELL, U. S. NAVY.

VII. INTRODUCTORY REMARKS TO CLINICAL COURSES.

The clinical advantages presented by this school are embraced in practical courses given at the Government Hospital for the Insane and at the Naval Medical School Hospital.

At the Government Hospital for the Insane, Dr. William A. White, who is an eminent authority upon all questions relating to the insane, gives weekly clinics. This course is invaluable for all medical men, and especially so for those who never have been brought in contact with the insane. In all there are about 3,000 patients from whom to choose cases to demonstrate the symptoms of the different forms of insanity, so the course is extremely practical.

All interesting cases that are treated at the Naval Medical School Hospital are shown and demonstrated to the members of the class and all are encouraged to study and follow the course of cases as long as they remain in the hospital.

The operations on the enlisted men at the hospital are performed by the individual members of the class under the direction of the instructor in surgery. Each man therefore receives actual operating experience on the live human body and becomes familiar with the operating technique of a modern institution.

SURGERY.

The course in surgery consists of recitations, lectures, demonstrations, and practical work on cadavers, dogs, animal intestines, gall bladders and bladders.

An endeavor is made to have each student acquire mechanical excellence in surgical procedures.

Special stress is laid on the study of gunshot wounds and their treatment. Cadavers and dogs recently killed are used in the experiments.

Operative technique on board the different types of ships in the navy is touched upon and emergency surgery such as is likely to occur in expeditions on shore is discussed.

The preparation for battle and the treatment and handling of the wounded is carefully considered.

Instruction, both practical and didactic, is given in genito-urinary diseases. Cases are cystoscoped and, as occasion presents itself, the

members of the class are instructed in the methods of ureteral catheterization.

Great importance is placed on the practical work in gastric and intestinal suturing. Each member of the class is required to perform a number of lateral anastomoses and credit is given for speed and for the accuracy in the placing of the sutures. Use is made of pig intestines and of the stomachs of freshly killed animals in this work.

All the different abdominal operations, including the different abdominal incisions are carefully explained. The class is expected to recite on the different points of each operation and be familiar with the surgical anatomy before they perform the operations on the cadaver.

The students, when they can do so, attend the operations in the Naval Medical School Hospital. They receive instruction in the different methods of sterilization of instruments, the hands of the operator, the operative field, dressings, etc., and the preparation of sutures.

The following operations are studied by recitation and quiz and are then performed by members of the class on cadavers in the surgical laboratory:

1. The ligations of all important arteries.
2. Amputations.
3. Special amputations.
4. Disarticulations.
5. Resection of joints and the long bones.
6. Head operations:
 - (a) Trephining.
 - (b) Osteoplastic flaps.
 - (c) Decompression operations.
 - (d) Mastoid (simple and radical).
 - (e) Operations on the frontal sinus.
 - (f) Resection of upper and lower jaw.
7. Golter.
8. Tracheotomy.
9. Lung surgery.
10. Resection of ribs.
11. Exposure of heart.
12. Abdominal operations:
 - (a) Liver.
 - (b) Gall bladder.
 - (c) Stomach.
 - (d) Pancreas.
 - (e) Spleen.
 - (f) Bladder.
 - (g) Small intestines.
 - (h) Large intestines.
13. Operations on kidneys.
14. Operations on ureter.
15. Variocoele.

16. Hernia operations.
17. Operations on testes.
18. Prostatectomy.
19. Hemorrhoids.
20. Laminectomy.
21. Nerve suturing.
22. Tendon suturing.

Prominent surgeons of national reputation are invited from time to time by the Surgeon-General to deliver lectures on special subjects to the class.—SURG. RAYMOND SPEAR, U. S. NAVY.

VIII. OPHTHALMOLOGY.

A more thorough knowledge of this branch of medicine is required of the medical officer in the navy than is expected of his brother practitioner in civil life. Hence the course, while not intended to cover the ground that a specialist would need, is arranged with the view of sufficiently perfecting the student to meet the requirements in the naval service, where, more than in any other, the eyes demand most careful attention.

Not alone from the standpoint of the exacting vision tests, which must be carefully applied to determine the physical fitness of all persons wishing to enter the service and the intelligent treatment of every form of ocular affection which may arise after the applicant has been accepted, but, in addition, the medical officer must be able to report upon and correct errors of refraction, diagnose and pass judgment upon all ocular defects, to determine whether the patient should be retained or discharged from the service; the latter feature involves the important point as to whether or not the affection was incurred in the line of duty. The correct interpretation of this point determines the justifiability of a claim against the Government for a future pension.

It can readily be seen that the medical officer must be well equipped to perform this duty properly. Unfortunately the average graduate from medical schools is poorly grounded in ophthalmology. Experience has shown that less than 1 per cent of the candidates for the Medical Corps of the Navy has had sufficient practice with the ophthalmoscope to use it even with fair success; hence the need of a supplementary course in this subject.

Following is a synopsis of the work in ophthalmology given at the Naval Medical School to all who enter the service. (An additional course is given in the spring to advanced students.) The idea being to make it as practicable as possible, a number of clinical cases are brought in each day for observation. A hundred well-selected cases, thoroughly studied and discussed, are of more value than several hundred imperfectly understood. On page 614 is a list of clinical cases which were given to recent classes in one school year and gives an idea of the character of the material furnished for study each year.

OUTLINE OF THE WORK.

First week: Lecture on physiological optics. Lecture on the vision test case. Prescriptions for glasses, and practice in determinating the strength of lenses (neutralization).

Second week: Lectures on the ophthalmoscope and how to use it; direct and indirect methods. Practical work with the ophthalmoscope on schematic eyes under different conditions of refraction.

Third week: Lectures on the normal "Fundus oculi" with physiological variations. Practical work on schematic and normal eyes. Clinical cases with demonstrations of each.

Fourth week: Lecture on hyperopia, myopia, and spasm of accommodation. Practical work determining above conditions by simple methods. Clinical cases.

Fifth week: Lectures on astigmatism with tests; accommodation, convergence. Practical work with ophthalmoscope on normal eyes. Clinical cases.

Sixth week: Lectures on refraction—the principles involved and objects to be attained. Practical work on normal and schematic eyes. Clinical cases.

Seventh week: Determination of visual acuity; special reference to requirements in the navy; how recorded; correction with glasses (Navy Regulations, 1909). Demonstration of the "unlearnable" test card for use in the United States Navy. Practical work in refraction. Clinical cases.

Eighth week: Lectures on the retinoscope and its practical use. Practical work with the retinoscope on schematic eyes. Clinical cases.

Ninth week: Lecture—How to examine an eye for pathological conditions, including oblique illumination, tension, location and removal of foreign bodies, peripheral vision, paralysis, scotoma, opacities, strabismus, etc. Practical application of the above. Clinical cases. Continued work in refraction.

Tenth week: Disease of the eyelids and treatment: diseases of the conjunctiva and treatment; special reference to conditions as they exist in the navy. Continued practice with the ophthalmoscope and retinoscope. Clinical cases.

Eleventh week: Diseases of the cornea. Practical work with clinical cases. Refraction continued.

Twelfth week: Diseases of the iris. Special reference to early and energetic treatment of acute iritis. The pupillary reflexes in health and disease. Practical work with the ophthalmoscope and retinoscope. Clinical cases.

Thirteenth week: Diseases of the lens and ciliary body. Practical work. Clinical cases. Refraction.

Fourteenth week: Diseases of the choroid and vitreous; special emphasis on specific disease. Transillumination. Clinical cases.

Fifteenth week: Diseases of the retina, with special reference to prognosis and ultimate usefulness of the eye. Clinical cases.

Sixteenth week: Diseases of the optic nerve. Clinical cases. Refraction continued.

Seventeenth week: Amblyopia; amaurosis; toxic conditions. How to determine whether or not these conditions are incident to the service. Clinical cases and practical work in refraction.

Eighteenth week: The entire procedure of locating foreign bodies in the eye and plotting their position (Dixon's method). Clinical cases. Refraction continued.

Nineteenth week: Glaucoma; diagnosis and treatment. Clinical cases. Refraction continued.

Twentieth week: Sympathetic ophthalmia, including sympathetic irritation, with special reference to cases in which it may and those in which it may not be expected.

Twenty-first week: Color blindness (tests as per United States Navy Regulations). Methods of detecting malingering (eyesight). Clinical cases.

Twenty-second week: Eye injuries, including treatment. When and when not to remove an eye. Clinical cases.

Twenty-third week: Ocular therapeutics, with operative procedures and technique. Descriptions of eye instruments furnished medical officers in the United States Navy and their use.

Twenty-fourth week: The operations iridectomy and cataract extraction, with special reference to the necessity for operating and management of complications. Operations on pig's eyes.

Twenty-fifth week: The eye in relation to general diseases. Nystagmus. The perimeter and its value in diagnosis. Clinical cases.

Twenty-sixth week: Demonstration of the electric otoscope and Hay's pharyngoscope. Special lectures will be given in the examination of the eyesight of (a) midshipmen, (b) civilians for commissions, (c) officers for promotion, and (d) officers for retirement, with special reference to the care and judgment to be exercised under varying conditions. Ear. Testing the hearing (United States Navy Regulations). Treatment of the common cases. Practical work in passing the eustachian catheter. Practical work in observing normal eardrums.

ILLUSTRATIVE OF THE CLINICAL CASES IN OPHTHALMOLOGY PRESENTED FOR EXAMINATION AND STUDY TO THE WINTER AND SPRING CLASSES, UNITED STATES NAVAL MEDICAL SCHOOL, 1907-8.

- | | |
|--|---|
| 1. Argyrosis. | 23. Simple glaucoma (R. E.). Retinal arteriosclerosis with exudates (L. E.) |
| 2. Irido-cyclitis. | 24. Double cortical cataract (early stage). |
| 3. Optic atrophy and incipient cataract. | 25. Simple myopia. |
| 4. Burn of the cornea (lime). | 26. Subacute retro-bulbar optic neuritis. |
| 5. Optic atrophy. | 27. Choked disk. |
| 6. Absorption of lens (opaque capsule remaining). | 28. Acute glaucoma (beginning in a blind eye). |
| 7. Specific neuroretinitis and vitreous opacities. | 29. Specific choroiditis with numerous vitreous opacities. |
| 8. Rupture of the choroid. | 30. Specific retinitis. |
| 9. Posterior capsular cataract. | 31. High myopia (12 D.). |
| 10. Optic atrophy (well advanced). | 32. Macula of the cornea. |
| 11. Secondary cataract (with Iridodonesis). | 33. Vitreous opacities. |
| 12. Pannus. | 34. Dislocated lens. |
| 13. Connective tissue extension on nerve head. | 35. Chemosis (from dionin). |
| 14. High astigmatism (fundus appearance under). | 36. Macular chorio-retinitis (right eye). |
| 15. Tay's choroiditis. | 37. Refraction with retinoscope (simple hyperopic astigmatism). |
| 16. Disseminated choroiditis, macula involved. | 38. Refraction with retinoscope (compound myopic astigmatism). |
| 17. Results of a specific Iritis. | 39. Refraction with retinoscope (simple myopic astigmatism). |
| 18. Toxic amblyopia. | 40. Refraction with retinoscope (mixed astigmatism). |
| 19. Becker's cataract (R. E.). Macula of the cornea (R. E.). Sclerosing keratitis. Specific chorio-retinitis (L. E.). Cataract extraction with iridectomy (L. E.). | 41. Refraction with retinoscope (mixed astigmatism). |
| 20. Simple noninflammatory glaucoma. | 42. Refraction with retinoscope (compound hyperopic astigmatism). |
| 21. Secondary cataract (R. E.). Nuclear cataract, early stage (L. E.). | 43. Refraction with retinoscope (scissors movement well marked). |
| 22. Double primary optic atrophy (advanced). | |

44. Refraction with retinoscope (hyperopia).
45. Refraction with retinoscope (high myopia).
46. Double optic atrophy.
47. Cataract extraction (with secondary cataract).
48. Simple glaucoma (with secondary atrophy, both eyes).
49. Chorio-retinitis (both eyes, specific).
50. Keratitis punctata specifica.
51. Convergent strabismus (alternating).
52. Nuclear cataract (both eyes).
53. Trachoma (acute).
54. Periorbitis (right orbit, specific).
55. Large macular chorio-retinitis.
56. Vitreous opacities, specific (R. E.).
Results of specific iritis (L. E.).
57. Pterygium (both eyes).
58. Normal cases for examination and refraction.
59. Normal cases for examination and refraction.
60. Malingering.
61. Compound hypertrophic astigmatism (for retinoscopic correction).
62. Secondary cataract (R. E.). Leucoma of cornea (L. E.). Anterior and posterior synechia (L. E.). Plastic exudates in anterior chamber (L. E.).
63. Enlarged accessory lachrymal glands.
Opaque optic nerve fibers (R. E.).
64. Plastic iritis.
65. Double optic atrophy.
66. Panophthalmitis.
67. Anterior polar cataract.
68. Specific retinitis.
69. Dislocation of the lachrymal gland.
70. Keratitis punctata superficialis.
71. Saemisch catarrh.
72. Uveitis.
73. Perinaud's conjunctivitis.
74. Ocular angioneurotic oedema.
75. High myopia with central choroiditis.
76. Specific iritis (old).
77. Optic neuritis (right eye).
78. Retinal appearance of high astigmatism.
79. Amblyopia ex-anopsia.
80. Paralysis of internal rectus (left eye).
81. Congenital optic atrophy (in young boy).
82. Parenchymatous keratitis (specific).
83. Serous cyst of the iris.
84. Specific retinitis.
85. Double uveitis. Vitreous opacities.
Descemetitis, etc.
86. Iritis (posterior synechia).
87. Sarcoma of the choroid (left eye).
88. Specific kerato-iritis.
89. Results of old irido-cyclitis. Irdec-tomy, etc.
90. Chorio-retinitis (right eye). Arterio-sclerosis, retinal (left eye).
91. Macular chorio-retinitis.
92. Sclerosing keratitis.
93. Immature cataract (both eyes).
94. Mycotic keratitis.
95. Double optic atrophy.
96. Cataract extraction (right eye).
Large posterior synechia (left eye).
97. Adherent leucoma.
98. Chorio-retinitis (extensive).
99. Glaucoma (simple). Optic atrophy (secondary).
100. Anterior polar cataract.
101. Nuclear cataract (left eye). Cataract extraction (right eye).
102. Macula of cornea.
103. Iridodonesis. Cataract extraction.
104. Malingering.
- 105-110. Refraction cases for retinoscopic work.
- 111-114. Normal cases for practice with ophthalmoscope.
115. Optic atrophy.
116. Interstitial keratitis.
117. Large physiological excavation.
118. Large central chorio-retinitis (left eye).
119. Beginning cortical cataract.
120. Keratitis profunda.
121. Atrophy of retina and choroid.

Additional cases are given for retinoscopic and ophthalmoscopic practice throughout the course.—SURG. E. J. GROW, U. S. NAVY.

IX. CLINICAL LECTURES IN PSYCHIATRY.

These lectures include a short consideration of such principles of psychology as are needed for the understanding of psychiatric problems; a discussion of the general principles of psycho-pathology; a description of the principal types of mental disorder, especially those that will be most frequently met with by naval surgeons; and some consideration of the special problems that are presented to the naval surgeon by mental disorder occurring in the service. The lectures covering the description of the types of mental disorder are illustrated by the presentation of numerous cases.

The lectures are held at the Government Hospital for the Insane. This hospital has approximately 3,000 beds.—WILLIAM A. WHITE, M. D., AND PASSED ASST. SURG. HEBER BUTTS, U. S. NAVY.

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X. COURSE IN DRILLS, SIGNALS, ETC.

1. Physical drill without arms.
2. Infantry tactics. School of the recruit. School of the squad.
A portion of school of the company without arms.
3. Hospital corps drill.
4. Manual of the sword.
5. Signals: Two-arm semaphore. Navy code, comprising (a) army and navy (wigwag) code and electric night (Ardois) system.
(b) Numbers and signal flags used in the United States naval service.
6. Compass: How to box and read.
7. Boats: Rowing, boat salutes, and how to read boat signals.
8. Barometers, aneroid and mercurial (graduations, readings, etc.).
9. Light-houses, beacons, and buoys, brief description of.
10. Flags of maritime nations.
11. Knotting, etc.
12. Sword exercise.—LIEUT. COMMANDER DOWNS L. WILSON, U. S. NAVY, RETIRED.

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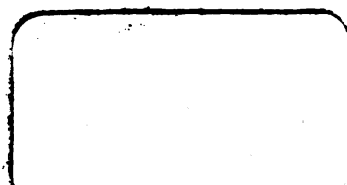
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